THE BUILDER

A JOURNAL FOR THE ARCHITECT AND CONSTRUCTOR.

WITH WHICH IS INCORPORATED "THE BRITISH ARCHITECT."

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THE NEW YEAR.

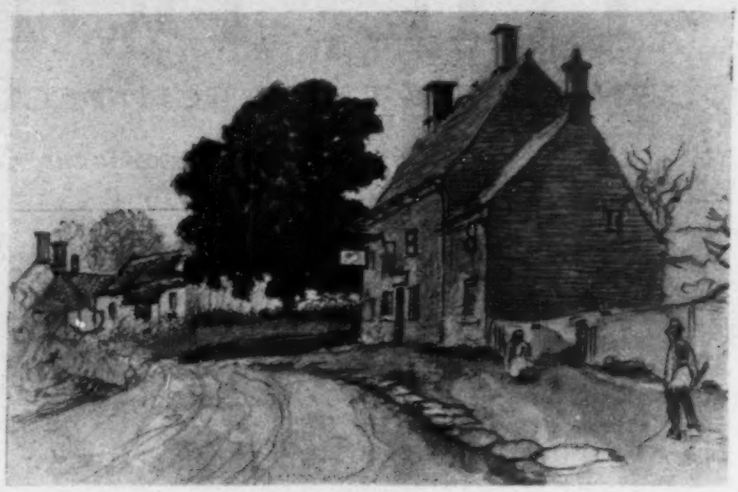
ANY survey of the activities of the past year, and of the cares which have clouded it—and it has been a time, no doubt, of much anxiety for us all—would do less than justice to the occasion if it failed to recognise the improved outlook which has been growing through it. But in saying this, we would not be misunderstood. When we have done homage to the more obvious considerations influencing public opinion, such as the necessity for increased production, the problem that with every new addition to machinery the capacity of each pair of hands is increased and therefore needs an economic expansion to grapple with it—when all is said for these oft-repeated doctrines, do they really enclose what so many of us are thinking? Is there not something behind all this of which we may lose sight in these rather obvious considerations? Are there no others? Must we then go on as we have before, knowing whither it has led us? We believe there is a "No" to this question in the heart of many, which compels us to look a little deeper, seeing that the future will be determined less by these obvious considerations than by the new thoughts stirring within us. In this power, trusting to our divining rod, we shall find the healing spring.

In such better views architecture, building, and the applied arts must hold high place, and it is in their closer union together—in the understanding of what is due from each to each—that they will be sustained. Nor is it easy to discover how a relationship which is at present too detached can be brought closer; how far unification and registration may conduce to it or impose further barriers. To be safe is often to become sterilised, and over-professionalism is not unattended with dangers. We are nearer vital considerations when able to realise that for the architect taste without intuition is not enough, nor for the craftsman craftsmanship without endowment. We must not rest content on the old paths. The need for building is at all times the human one; that we do not too much hold ourselves aloof in an abstract good, but we should build around the hearth fires of humanity. It is the fires of life that kindle architecture more than professional security, or the exclusiveness of taste and the pride of craftsmanship. Ministering then to common needs, without aloofness or sectional aims, architecture should reach what perhaps it has never reached before, what it never can reach without the humility to grasp these essential needs.

In considering the difficulties of the architect at the present time, the paramount one is perhaps that of uniting his function as an artist with the multifarious and greatly accumulated details of his calling. It seems as though some closer federation is inevitable between men, that they may share their labours more in common—the architect left freer for his own particular contribution. But we must reach a better understanding of that which is often a difficulty in the mind of the architect, as it is with all who labour in the arts. It is seldom that the artist in us is paid, and this crown of his work must be the contribution to those things which, like love and religion, are not paid for—thus freed from himself, his work will acquire a new illumination from the secret which sustains him. For in that secret is contained what he owes to others rather than what they pay to him. It is on this outlook, on the attitude he holds towards life, that the future depends. It is of little use to stand wondering whether conditions will improve, whether, as some are thinking, European civilisation is in its decline; by giving form to the ideas stirring within us we shall control events, finding in ourselves the assurance able to master unpropitious circumstances. It is incumbent on us all to-day to feel something of this power to master rather than wait on events; turning with indignation from the falsities of a "fate stronger than man's will," and from economic shibboleths which hide the truth from us, finding new consecration for our lives in these better beliefs, against the doubts that would destroy us. We have become dislodged rather from the old grand conviction that there was no higher law than that of circumstances governing our lives, making an idol of the jargon of economic necessity. If we have indeed lost the former, we drift—no sophistry can hide this from us—and the abyss is near. But to state it is its refutation, and humanity is rising against it. For life itself is its refutation, and never was life stirring more abundantly than to-day. And that man is not ill-advised who refrains from watering his own garden too much. There is another and better self-help than that adumbrated by Dr. Samuel Smiles. The adventure is higher than all this, which has the soil of time upon it. There is a new errantry that will not be denied the joy of this healthier experience, this new exaltation. Nor is this any easy optimism, but to see things more as they are. It is easier than we thought, and the way more direct because we take more note of the extended scope of our life, which is gripped in a larger destiny than that only of its daily bread. As a great poet has said, "think of living," and if one has enough to purchase a loaf of bread spend half and buy a bunch of narcissus. "Life," so it has been said, "is a glittering flower-garden on the edge of an abyss." Europe has travelled perilously near the abyss during the last fateful, ominous years, and the task of the new year must be to give form to the vision through which alone new foothold may be restored. And what greater contribution is there to its restoration than that which architecture, building, and the applied arts can bestow—with their firm hold of form, of reality, designing and constructing, not in a world of blind chance, but of order and guidance, because results can ensue only out of such conditions? Let the impotent fear, but not those who feel the force of good will, efficiency, and manly independence.

If this New Year's dawn "comes up like thunder," charged with portents of immense significance for the shaping of the future, if its birth is from out the dark shadow of recent years, we shall look all the more to the humanities, to the hard sacrifices of the arts of peace on which the world now rests. There are some who will tell us that democracy fails, arguing less from its faults, from its inexperience, its failures, than from its challenge to themselves, mistaking quickening thought for licence, and believing more in the gun than in its vast ameliorative potentialities. But if some doubt, our younger men dream, shedding many old clothes in the process. Nor are they disrespectful of authority or attainment if their truer values displace much that we once counted true. Democracy without art, without the venture of faith, is barbarism, however much wealth, office and complacency disguise it. Without the "humanities" on which the world rests material prosperity is but a deadly narcotic—a volcano active towards destruction. It is between the ways that we now stand, and democracy will meet the challenge, finding its answer—its choice—in a life exalted above economic necessity because inspired by a nobler intuition of the meaning and purpose of life.

NOTES.



The "Swan" Inn, Sotherop. (*See p.* 7.)

The Cost of Building: Two Competitions.

THE decline in the cost of building since the period of highest cost in 1921 has been considerable, and it has been reflected in an increasing tendency by building owners to embark on work which, in consequence of high costs and trade uncertainties, has been considerably delayed. But we cannot ignore the fact that there is much uncertainty and hesitation on the part of the building public, and in their belief that prices are likely to fall lower there is still a tendency on their part to delay building until what they consider will be a more favourable time. No doubt we shall strike a level of prices one day, but it would be a disastrous state of affairs if everyone thought they would be rewarded by putting off building until they were sure prices had reached bottom. As it is, opinions differ as to the probability of a continued fall in the cost of building, and some uncertainty as to prices is inevitable even in the most stable conditions. In the belief that a fuller knowledge of house building costs may be obtained, we are promoting two competitions, (*a*) for architects to design and (*b*) for builders to erect two types of dwelling houses, fuller information in regard to which will be found on p. 40. The purpose of the first competition, open to architects, is to encourage house-building by demonstrating that it is possible to obtain substantial houses on an economically sound basis. The second competition, open to builders, is promoted for the purpose of clearing up, if possible, the present uncertainty as to the cost of house-building. We are assured that the publication of detailed estimates for the erection of houses from the designs produced in the first competition will inspire confidence in the house-building public, and we hope results will justify such a belief in every way.

Sir Edwin Cooper.

THE architectural profession has once more been honoured in the bestowal of a knighthood on the architect of the Port of London Authority building who now becomes Sir T. Edwin Cooper. A long record of practice carried out with some genuine distinction has certainly placed Sir Edwin Cooper in the front rank of living architects. He has done service on committees, and when he felt it needful has made his voice heard, but he has lived and spoken through his work, seeking no publicity or credit through any other sources. Whatever may be the judgment of the future on some of his more notable works, like the Marylebone Town Hall and the Port of London offices, they cannot fail to be recognised as notable efforts in the architecture of our time and as the work of a sincere artist with definite aims. Much important work is still to come from his hands, and we hope he will have a good share of health and happiness to enjoy a well-deserved honour.

Building in London.

A WALK through the central districts of the Metropolis reveals the extent of activity occupied on new buildings. The West End is just now very much in the hands of the housebreakers. Great pyramidal wooden structures supporting immense derricks testify to the scale of the operations, which are mostly concerned with large commercial undertakings. We wish there were a parallel activity in the building industry directed to housing. The need is so pressing, the conditions meanwhile so deplorable, that we wish private enterprise had more incentive for supplying housing needs. The failure of the Government housing scheme, which at a cost of £200,000,000 built only two hundred thousand houses, and saddled the country with an annual loss of nearly ten millions, is a warning against Government enterprise, and it is to the private builder that in the main we must now look. As stated in a leader in *The Times*, "the dearth of houses is so great . . . that in many homes moral training is impossible." It must be a matter of deep national regret that such a state of things should exist, and it should be remedied as soon as possible.

Old Barn, Sotherop.

Building By-Laws. THE recent paper on by-laws at the R.I.B.A., and the discussion which followed it, seem to indicate that the trouble is due to the difficulty of providing an adequate salary to attract men with the necessary professional knowledge to fill the post of "surveyor" in the case of the smaller district councils. If a committee were appointed by the R.I.B.A. to consider the revision of local by-laws, something might be done to appoint an advisory surveyor to groups of the smaller councils whose function it would be to settle difficulties in the interpretation of the by-laws of each authority in his circuit. The formation of Joint Town-Planning Committees for the preparation of regional surveys, comprising many different local authorities, shows what can be done by co-operation, and has, in practice, generally worked well. If this principle were adopted with regard to the interpretation of by-laws with the assistance of local architects, we think it would result in the disappearance of many vexatious and unnecessary restrictions and a clearer appreciation of the advantages or the disadvantages of the existing regulations.

The Wessex Society of Architects. AN important development in the organisation of the architectural profession in the West of England has just been completed by an agreement between the Bristol Society of Architects and the Gloucestershire Architectural Association. The two bodies have been combined in a new body known as "The Wessex Society of Architects." The new Society will have as its province the counties of Somerset, Gloucestershire, Wiltshire and Dorset, and the two constituent societies will retain their original titles as branches of the Wessex Society. Mr. Thomas Hardy, O.M., the famous poet and novelist, who is an Honorary Fellow of the R.I.B.A., has accepted the first Honorary Fellowship of the new body, which has been admitted as an "Allied Society" of the Royal Institute.

Sir John Soane, R.A. SINCE his appointment as Curator to the Soane Museum Mr. Arthur T. Bolton has done much to realise its value to us, by writing and illustration, and also by many pleasant visits of inspection which he has arranged. His latest work is a pamphlet just issued on the Life and Work of Sir John Soane (the eleventh Soane Museum publication), which gives us a record picturing the whole of that interesting period as it affected the life and character of the great architect. If ninety per cent. of those who know anything at all about Soane only think of him as an eccentric who disinherited his sons and confused his executors, it is obvious this little pamphlet fulfils a useful mission. Soane was born under George II and lived to within a few months of Victoria's accession; his career ran through from Adam and Chambers to Barry, and he was for 45 years architect to the Bank of England. He came to London a poor boy, beginning at once to buy books, of which he had over 8,000 at his death. His office hours were always from 7 to 7 or from 8 to 8, and his concentration and energy were singularly great. He has had a lasting fame as the designer of the Bank of England, several illustrations of which appear in Mr. Bolton's record.

The Reconstruction of Dublin. A PROPOSAL for a scheme involving an expenditure of some £10,000,000 within ten years has been discussed at a meeting of the Engineering and Scientific Association of Ireland. It includes a new General Post Office at the old Custom House, and an Art Gallery and Park at the Four Courts site. It is not clear whether these two buildings are, under this scheme, to be restored exactly as they were, or whether they are to be demolished or altered externally. This must be the principal concern to any lover of architecture, and the inhabitants of Dublin may not fully realise how highly these buildings are prized in England and abroad as an important part of the world's architectural inheritance. There will be temptations to Irish architects to see whether they can improve upon Gandon's work, but we hope that these temptations will be resisted and that (however much the interiors of these structures may be remodelled) at least the elevations and domes will be restored exactly as they were, that the

Fyfield Manor.

world may not be the poorer by their loss. The outside of the Custom House, except for the dome, has hardly suffered at all; while the Four Courts, although the dome has disappeared and the walls and columns have been battered by shell fire, is not at all beyond repair, and much of the superficial damage to the stonework could be left as it is. The Irish Government, in pointing out that time is required for the consideration of the proposal as a whole, reminds the Association that many private interests and public bodies must be consulted before the scheme becomes sufficiently advanced to involve the Government. This, of course, is true; but we remember that private interests prevented the remodelling of London on the lines proposed by Wren, and has caused us untold loss and inconvenience ever since. Private interests must be consulted and met, but the difficulty lies in striking the happy mean between private interests and public advantage, which, unfortunately, by no means always coincide.

La Porte de Paris, Gournay en Bray, Normandy.
From a Sketch by LIEUT.-COL. H. P. CART DE LAFONTAINE, A.R.I.B.A.

The Safeguarding of Monuments.

THIS is a subject on which much attention is bestowed at the present time, and we need only to have a little acquaintance with the subject, as it regards London, to realise its importance; one which affects not only the more ancient buildings, but sites and squares of more recent date, such as Bloomsbury, for instance. This safeguarding, if it is to be done, requires to be done quickly, as one of the chief difficulties in preventing acts of vandalism arises through hearing of them too late, when the matter is already too far advanced to intervene successfully. At the same time we do not need to become too sentimental over the matter, or forget that the safeguarding of monuments is only half, and perhaps the lesser half, of our duty, which is to safeguard that we build worthily ourselves. We have suffered a great deal in the past from the contradiction of this salient provision. It was when the enthusiasm for the Gothic period of building was at its height that the worst injuries were carried out by restoration—to Gothic buildings! The danger just now lies in a tendency to short views, to utilitarian assumptions; to consider the immediate advantage rather than the more permanent one. To preserve the City churches—churches, many of them, insufficiently used—may sound rather sentimental, when, by their sale, large revenues could be secured to the Church for much-needed work, and on the "short view" of things this seems a reasonable argument. Nevertheless, these churches enshrine more for us than even their use as churches; they are monuments forming part of the history and character of London not lightly to be destroyed. Their value is not one to be computed by money, but by the influence which their tradition and character bestows on our city and life to-day—a life in danger of being too preoccupied with its own affairs to see them in true perspective.

Entrance Gates, Hotel de Ville Lisieux
From a Sketch by LIEUT.-COL. H. P. CART DE LAFONTAINE, A.R.I.B.A.

Materials for Colour on Buildings.

So far, we do not think that efforts to promote new sources of effect in colour have been conspicuously successful on buildings. The use of the glazed tile for a wall surface is not for some reason agreeable. Varieties of brick, stone and half-timbering, offer a wide range of resource in themselves, and it seems as though we could not easily extend beyond these more traditional materials. An absorbent surface, such as that presented by stone, brick, or tile, is preferable to non-absorbent surfaces; and we have seen a successful example of the use of a large red absorbent tile—such as were used for the floor of bake-houses a century ago—introduced on a roughcast wall surface, making accents of very agreeable colour through it. The climate does not encourage a too gay dressing of our buildings, and the defect of the "simple white stone" used in the new buildings referred to in *The Times* last week lies more in the way it is used, in the lack of expression. Is it possible the commercial needs as interpreted to-day hardly permit of that character which promotes romance?

New Year Hopes.

To all our readers, not because they are subscribers, nor because they will read what we say, we offer our sincere good wishes for the New Year, and (we cannot resist the opportunity!) we venture to hope that now, and long after the festive season has passed, they and we may endeavour to study and allow for the point of view of our fellows, so that difficulties and disputes may be more easily settled and we may in large measure realise that ever-welcome vision of "good will to men."

The "Chicago Tribune" Building Competition.

First Premiated Design, by MR. JOHN M. HOWELLS, associated with MR. RAYMOND M. HOOD

GENERAL NEWS.

Professional Announcements.

Mr. Henry Tanner has removed to 3, Hanover-square, W. 1. (Telephone: Mayfair, 861-862.)

Mr. Alan W. Dawson, F.S.I., has returned to his pre-war offices at Belgravia-chambers, 72, Victoria-street, S.W. 1. Priced 1923 catalogues will be acceptable.

The offices of Messrs. Pickup & Balderstone have been transferred to 7A, Hargreaves-street, Burnley.

Mr. C. Cowles-Voysey, A.R.I.B.A., has removed his office from 88, Gower-street to 14, Gray's Inn-square, W.C.1. (Telephone: Chancery 8058.)

A partnership has been arranged between Mr. E. Keynes Purchase, F.R.I.B.A., F.S.I., and Mr. Roland Welch, A.R.I.B.A. The title of the firm will be Messrs. E. Keynes Purchase & Roland Welch, and the address, 20 and 22, Maddox-street, W.1. (Telephone: Mayfair 2404.)

Mr. Hugh T. Morgan, A.R.I.B.A., has removed his office from 88, Gower-street to 14, Gray's Inn-square, W.C.1. (Telephone: Chancery 8058.)

Mr. Percy W. Meredith, F.R.I.B.A., has removed from No. 11, Rochester-row, S.W.1, to No. 34, Old Queen-street, Westminster, S.W.1. (Telephone Victoria 6492.)

New Year Honours.

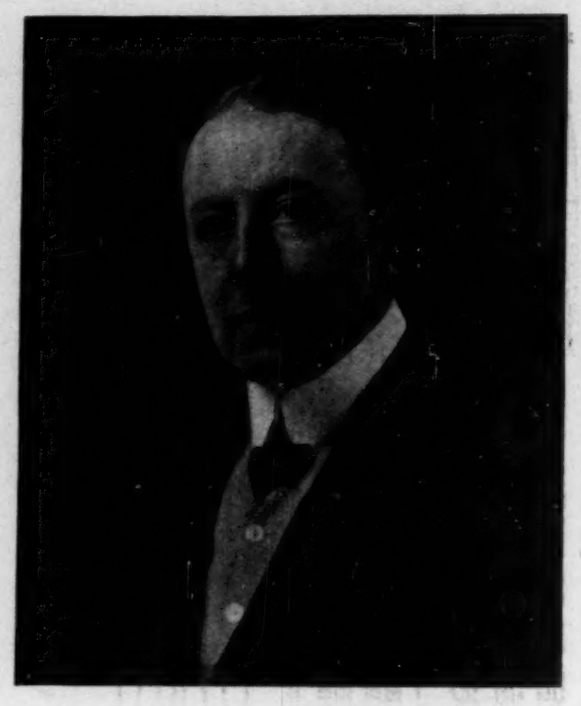
The list of New Year Honours issued on Monday announced the honour of Knighthood conferred on Mr. Thomas Edwin Cooper, F.R.I.B.A., architect of the Port of London Authority building, and Mr. H. E. P. Hughes-Stanton, R.A. (President of the Royal Society of Painters in Water-Colours). The Foreign Office list included the appointment of Dr. D. B. Spooner, Deputy Director-General of Archæology in India, to O.B.E. Sir Frank Baines, C.B.E., M.V.O. (Director of H.M. Office of Works) was promoted C.V.O.

British Architecture.

The Exhibition of Contemporary British Architecture which has been on view in the Galleries of the Royal Institute of British Architects since December 1 closed on December 22 and practically the whole of the exhibits are now being packed for immediate despatch to New York, where they will form the British Section of the Continental Exhibition of Architecture which is being organised by the Architecture League of New York. The Exhibition will open in February in New York, and it is anticipated that it will afterwards be sent to a number of the larger cities.

The Incorporation of Architects in Scotland.

The monthly meeting of the Council was held recently, Mr. T. P. Marwick, F.R.I.B.A., President, being in the chair. The draft by-laws under the Charter were considered preparatory to being submitted to the Privy Council. One Fellow, six Associates, and seven students were elected. The Education Committee were empowered to have the conditions connected with scholarships and prizes printed and distributed throughout the profession and the secondary schools in Scotland.



Sir Edwin Cooper, F.R.I.B.A.

Fire Destroys the Goetheanum.

It has been reported at the London headquarters of the Anthroposophical Society that the Goetheanum, the building designed by Dr. Rudolf Steiner, the Austrian founder of the movement (see *The Builder*, July 23, 1920), and erected at Dornach, Switzerland, has been totally destroyed by fire.

COMPETITION NEWS.

Cost of Building Competition.

Particulars of two competitions promoted by *The Builder* with the object of ascertaining the cost of building working-class dwellings are given on p. 40.

International Labour Office, Geneva.

The President of the Royal Institute of British Architects has nominated Mr. Edward P. Warren, F.S.A., F.R.I.B.A., as the British member of the jury in connection with the above competition.

Pavilion, Tunbridge Wells.

The President of the Royal Institute of British Architects has nominated Mr. E. Guy Dawber, F.S.A., F.R.I.B.A., as Assessor in this competition.

"Chicago Tribune" Building.

The assessors in the *Chicago Tribune* building competition have awarded the premiums as follows:—

First: Mr. J. M. Howells and Mr. R. M. Hood (New York).

Second: Mr. Eliel Saarinen (Helsingfors) and Messrs. Wallace & Grenman.

The first premiated design is illustrated on p. 5.

Other Competitions.

Other competitions still open include the following (the dates given are, first the sending-in date, and second the issue of *The Builder* in which full particulars were given): Port Said War Memorial (March 31, 1923, Sept. 29); American Hospital (Feb. 1, 1 23, Nov. 24); Dewsbury War Memorial (March 31, 1923. Dec. 1).

CORRESPONDENCE.

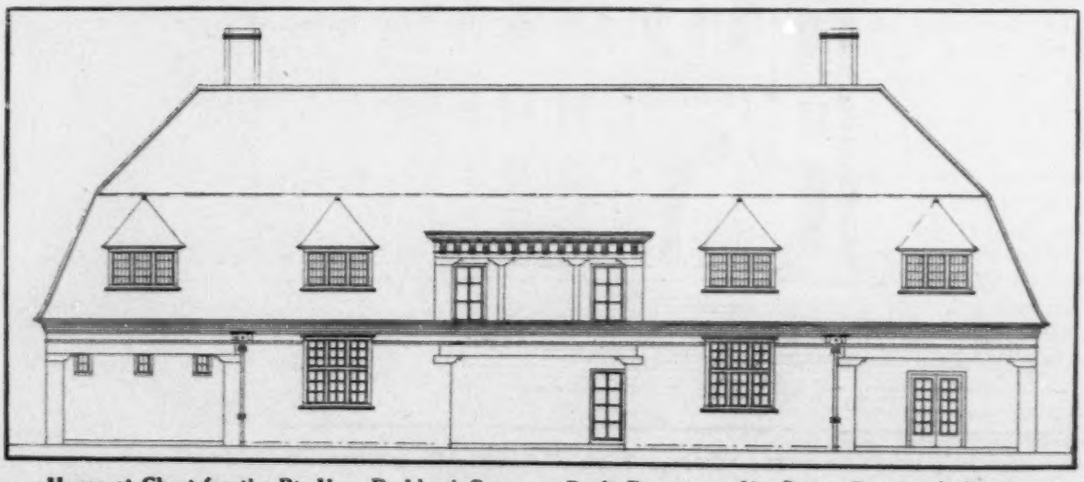
This week we give correspondence on p. 56.

Obituary.

The death has taken place at his residence, 11, West Lawn, Sunderland, of Mr. George Thomas Brown, architect and surveyor. The deceased gentleman was trained at the offices of Messrs. Tillman & Sons, architects and surveyors, and commenced business on his own behalf about thirty years ago. He was the designer of a number of prominent buildings in the borough, and was advising architect to the Wearmouth Coal Co., and the Thornhill Estate, Sunderland. He was a member of the Northern Architectural Association, and at the time of his death held the position of hon. treasurer. He had also occupied the Presidential chair a few years ago.

North Perrott War Memorial.

The North Perrott War Memorial, by Mr. H. M. Fletcher, F.R.I.B.A., illustrated in our last issue, is in Somerset, not Devon, as stated.



House at Churt for the Rt. Hon. D. Lloyd George: Back Elevation. MR. PHILIP TILDEN, Architect

A CORNER OF THE COTSWOLDS.

No more complete contrast from the bustle and ugliness of our great towns will be found in perfect realisation than the sweet little old-world village of Sotherop in the Cotswolds. There is not even an exaggerated claim of picturesqueness amongst the groups of its well-proportioned simple cottages. It is the unaffected charm of pleasing form and delightful tone which everywhere meets the eye in this genuine old-world village, with hardly one intruding note of harshness or offence. What a proportion of good to bad is here compared with any of our modern towns! Yet the sad thing about it all is that these beautiful old cottages represent a comfort and content of past times that modern conditions have now pushed out of our reach. Plenty of work and variety of entertainment have attracted folk to the miserable looking houses of our crowded towns, whilst decent means of existence seem to recede further and further from the grasp of those who would live in these charming old-world cottages. There may be many villages which at first sight appear more attractive, but there are few, indeed, that convey such a complete feeling of restful charm as Sotherop. No evidence of ordered planning about its roads and cottage groups intrudes on the impression that it has all happened in an easy natural way out of a traditional knowledge which has developed with the years from precedent to precedent. The trees, the houses, and the roads combine into pictures which arrest the eye at every turn. A barn, a dovecote, a manor house, an inn, or a row of cottages come alternatively as the centres of many charming scenes, and one wonders what, if anything, is coming to supply the place of such pictures of village life. The steep-pitched roofs with their piquant little spread-out at the eaves and the happy proportions of solids and voids are at once in evidence to the architect, whilst he wonders at the audacity with which the end rafters are built on the face of the gables with the ends of purlins and plates exposed to the weather. The whole vision of these old-world places may be only a faded joy, but the lessons and inspiration they convey still remain, and one would be almost ready to measure the capacity and possibilities of the young architect by his understanding of these things. How could any lover of architectural charm find a better tryst for his mistress art than in the Cotswolds? Especially will the quintessence of it be found in the long sloping street of Burford, with its glorious church and manor house. No student could find a more perfect place for his studies, his sketches, and his sympathies. It is all a beautiful picture of our dear old England.—T. RAFFLES DAVISON.

The Manor House. Gate Pier.

Old House and Barn at Sotherop.

THE BUILDING ART: THEORIES AND DISCUSSIONS.—I.

By W. R. LETHABY.

ARCHITECTS' AMBITIONS.

Life is the continuous adjustment of internal relations to external relations.
HERBERT SPENCER.

Now, at the opening of a New Year, I should like to be allowed to discuss some general and, indeed, universal problems of theory. Such questions are difficult because they lie beyond the narrow field of exact demonstration, and are founded rather on assumptions and ideals than on "proofs." In writing this sentence I am reminded of having once objected, in conversation with a friend, to something he suggested: "That is a mere assumption"; on which he replied: "My dear Lethaby, everything is an assumption." Wherever we may put the dividing edge between "fact" and "idea" I think my friend was right, and that most that matters most is an assumption—honour, courage, service, poetry, art, rest mainly on assumptions. What chiefly matters to a community (and possibly to persons, but I must keep to the general as much as possible) is the quality of the assumptions they make and act on. We live, and think, and work according to our assumptions. More than anything else the mysterious central *we* is formed of our assumptions.

What should be our assumptions, or, to change the word, our ambitions, in our own life-calling as directors of building? It is usual for ethical teachers to class ambition with the vices, and I suppose, taking the narrow and exact meaning of the word as given by Skeat—"seeking for preferment: going round canvassing for votes"—that it is hardly by itself a thing to praise. We seem, however, to have no such telling and effective word for right and useful objectives and noble purposes, and the word is commonly now used of those, as well as of mean and vain desires. In this sense nothing appears to me more to be wished than the clear thinking out of our ambitions. One of the greatest faults of all kinds of modern "education" is that it is very shy of raising any questions about aims, ends, and sanctions. This education fears to make positive assumptions, so it makes negative ones—you cannot escape them—and it has become largely mechanical: it teaches reading in elementary schools, but has little influence on what is read; it teaches painting in art schools, but does not attempt to say what is worth painting; it teaches what it calls "Architecture" in what it calls *Ateliers*, but it is extraordinarily feeble in anything like definition, explanation or justification. It seems to put its trust in turning the wheels ever more quickly and blowing steam whistles to keep our courage up. We teach all things as mechanism, not for mind and spirit, the community and right.

Now I come to our ambitions themselves, what they are and what they should be; and I want to proceed gently, sympathetically, and facing facts. It must be admitted that ambition comes to most of us immediately as a personal question, and that personal "success" is not necessarily always in the line of community service. Still, I think that I may "assume" that we would like our personal "success" so far as possible to be legitimate and sportsmanlike, not founded on an accident, abuse or absurdity. We would like not only to be much admired but to be a little worthy of admiration as well. If we can just escape starvation and going to prison for it, we would *like* our life-work to be as sound and sensible as may be in a difficult world. However, it must be pointed out that this question of starvation is individual in the narrowest sense. If England as a whole were living at a high level of community ambition, temper, and intelligence, less people would doubtless be in fear of starvation than when the community is on a low plane; moreover, there would certainly be a better selection as to who should starve. The second great mistake of modern education, I suggest, is that it fosters and forces the personal competitive spirit, by marks and distinctions, and prizes: it still prepares young men as rats or bulls were bred for the ring. Indeed, it is almost a wonder that bookmakers do not quote the odds on favourites. Much art education is occupied in applying hot fomentations to produce swelled heads.

If we would only think of it for two minutes, I believe it would appear self-evident that education should be concerned with groups, and should train for community development rather than for individual scrambling and scoring. In our own art of building little or nothing is taught of its proper purpose and noble human service, but the students are incited to make a show of all that is most superficial, misleading and personal. It is a further difficulty with young students that it appears that what practising architects most want, in any assistants they hire, is efficiency, not in building, but in the get-competition-quick style of drawing and "design." Students are not trained to be good builders for the nation's sake, they are rather trained to be showy draughtsmen and colourists so that they may help the employer who bets on them to "pull off the events" for which they enter under the racing rules of the Royal Institute of British Architects. Under the high-sounding, ambiguous name of Architecture this is the vicious circle into which crowds of generous-minded young men are betrayed. Thus the mischief is carried forward from generation to generation. The young do not know the facts, they are attracted and dazzled by the coloured lights dangled just in front of their noses: the older professionals do not see how they can escape from the system; moreover, they are either "successful" or beaten men, and it is not the rule of the game for either side to explain or complain.

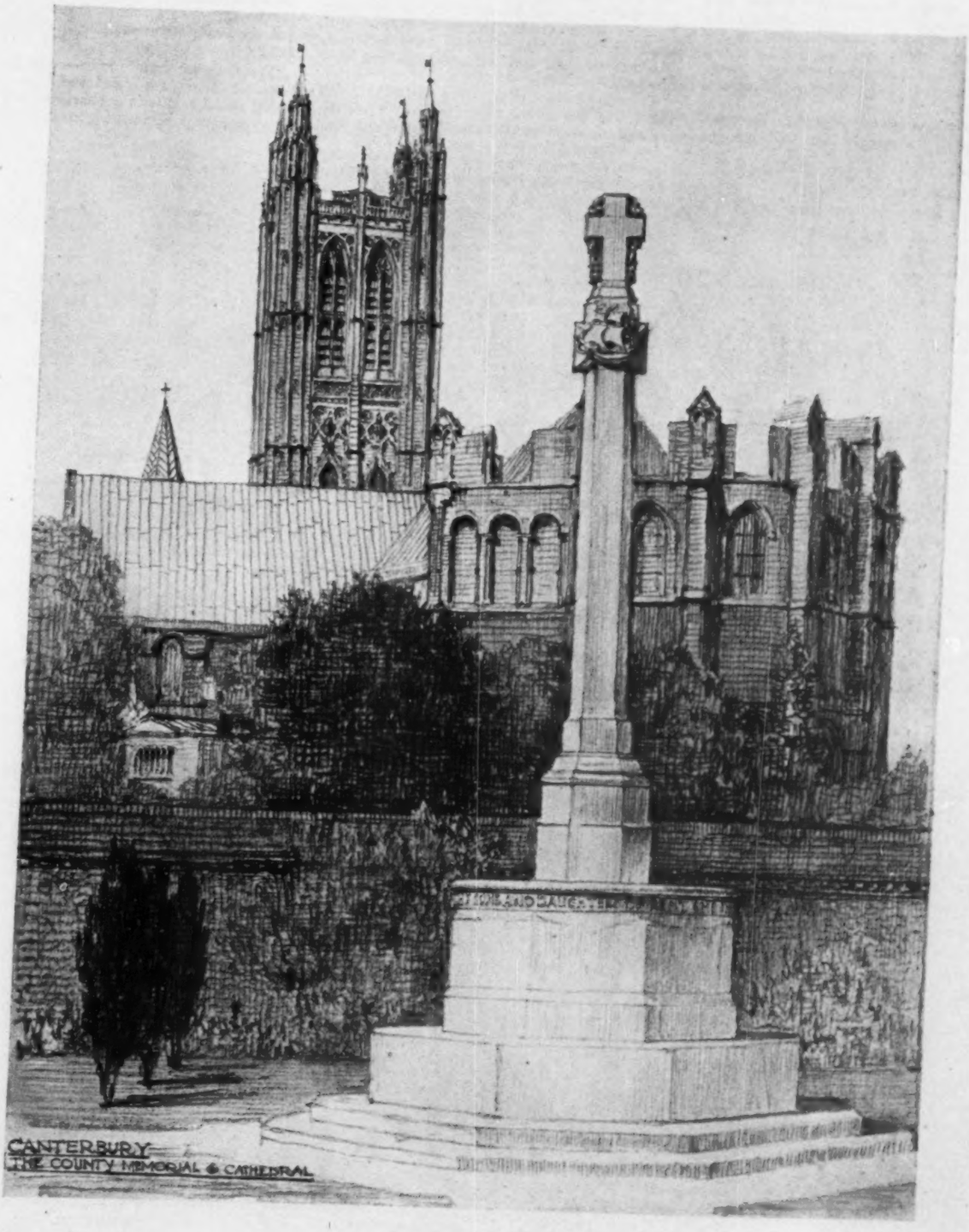
Notwithstanding the necessary handicap (how naturally we talk according to the code!) of their lack of knowledge and of their not having attained to enlightenment or disillusionment, my hope is rather with youth than with the elders, and I would like to hear of their having gathered together to consider the ground-work of their high calling and the ground-plan of their own efforts in it. If they pondered these in relation to larger aims than "rendering competition drawings," they would hardly come to very wrong conclusions. I suggest six headings under which to gather thoughts and form ideas on what should be our ambitions as modern architects:—(1) Loyalty to the noble art itself; (2) service to the community; (3) the idea of national culture; (4) international emulation; (5) the universal right; (6) an opening for a reasonable form of personal development.

It may be urged that in the main we can only do as we must. Well, even granting this, there are various interpretations of "must" according to the leading assumptions which I discussed above. But I would suggest that, even after an extreme interpretation of such "necessity," there is some margin and percentage left free for our own will and spirit to function in. Learn as a student what the teachers insist on teaching, but with some discrimination; hear the "theory" they expound, but exercise your own mind on the matter: don't be browbeaten with mere unintelligibility. All the time, so far as common sense is permitted, learn how to *build*, learn how to be a confident constructor, go beyond mere routine "construction," delight in the *constructive sense* and seek perfect solutions—elegant, bold, convincing. I would like all students to think out, as early as possible, what kind of "architecture" they believe would really satisfy them, and which would be worthy of their full ambition. I have thought over this question for full forty years, and I can tell you my results for what they are worth. Neither sham Greek nor sham Gothic would content me in the very least, however amazingly "clever" they might be; nor would the harsh and hollow splendours of the Paris station and Opera House style; nor, again, would the American commercial style of stores and cinemas. Only a theory of architecture which applied alike to the humblest little dwelling and the greatest of public structures, and only a method of building, keen, logical, bold and tidy, yet human and kind, would begin to satisfy me in the least. All the rest are the husks that the prodigal ate.

If our architects could and would decide what sort of work they willed to do, there is no doubt that this would influence public demand. Architects have not sufficiently realised that they are not mere purveyors of fashions, but that they form the nation's advisory body in the great necessary activity of building. By directing our ambitions more consciously and directly towards doing the kind of work that the national building service should be doing in the next dozen years, we should only be fulfilling our proper functions; and if we don't do it we are betraying our

trust. If architects themselves will not accept the charge, then some other body must. In my time there was no general thought or public sense; we architects just floated along in a world which tried to be content with sham Jacobean houses for Manchester manufacturers, and sham mediæval churches for Oxford clergy—ostrich architecture. Now at the moment there is some demand for department stores which shall seem smart to shopping women, and for "picture palaces" to dope the people—dividend architecture. But these, too, can hardly last long, and what shall we do then? For these and such-like vain and vanishing shows I would have young architects substitute a clear view of an Architecture of Public Service and seeing England as it is, with its dearth of cottages, slum towns, run-down railway stations, and insufficient civic buildings, set their ambition on bettering these things; helping by interest and teaching to prepare the field in which they would labour.

We necessarily let most of the stream of print rush by us, but I would ask the free and open-minded reader to consider for one minute each the three conceptions—Ostrich, head in sand, architecture: Dividend and superficial splendour architecture: Public service architecture. No vows need be made, merely clearing your thought should make a difference.



The Kent County War Memorial.

MR. HERBERT BAKER, A.R.A., Architect.

[From a drawing by LIEUT.-COLONEL H. P. CART DE LAFONTAINE, A.R.I.B.A.]

SOME NOTES ON THE BY-WAYS OF BRITTANY AND NORMANDY.

BY H. P. CART DE LAFONTAINE, O.B.E., A.R.I.B.A.

DURING a summer visit to Brittany, when the sun illuminates this enchanted country of romance, one is continually impressed by the amazing contrast of sheltered nooks, with semi-tropical vegetation, nestling close to the wind-swept coast, where the smallest tree can never grow upright but assumes curious and fantastic shapes in its perpetual struggle for existence. It therefore appears almost in the natural order of things that the district is rich in curious and interesting buildings; richly decorated churches, picturesque homesteads and simple cottages.

Each district has its own particular character, compounded of a mixture of local tradition, the influence of climate and material, and the assimilation of new ideas from the capital; the latter seem generally to have taken at least half-a-century to reach Brittany in mediæval times.

The buildings in each town and village, too, are a reflection of ideas of the different races and their customs, dating from the legendary days of King Arthur, or, more distant still, those Druidical ancestors who have left their mark in menhirs and dolmens scattered over the land.

The churches are everywhere remarkable and have (for the most part) escaped both the iconoclastic rage of the Revolution and the perhaps more deadly peril of "restoration." Sometimes—as at Notre Dame du Bon Secours, at Guingamp—the builders took risks with disastrous results. In this case the southern tower collapsed, destroying in its fall a part of the newly-built church soon after it was completed in 1547, and was rebuilt—this time with an ample margin of safety—during the following year. In this same church the choir, inspired by the work in the Ile-de-France of some half-century earlier, is constructed and vaulted in granite. Naturally the piers soon gave signs of being unable to resist the thrust of the heavy granite vaulting, and the unusual expedient of constructing flying buttresses *inside* the church (in the ambulatory), was adopted by the mediæval architect, with considerable ingenuity and skill.

The amazing granite masonry of the famous open-air "calvaires" and the elaborate sculptured detail which is a characteristic of these churches, are possible owing to the special quality

Monumental Fountain, Gournay en Bray, Normandy.

A House in the Market Place, Lannion.

of the granite, which (it is said) when first quarried is fairly easy to carve but which hardens on exposure to the air. In other districts (as at St. Brieuc) this special quality is not found in the local granite, and consequently the domestic work is relatively plain; in some of the houses there is no external moulded work at all, yet (owing to the instinctive appreciation of grouping and proportion) these cottages are charming in effect. In the town of St. Brieuc itself there is much interesting half-timbered work, very similar to the houses in Normandy, with grotesque carvings ornamenting struts and corbels, each story slightly projecting beyond the one below and terminating in a steep pitched gable roof. In Leon, the architecture partakes of the grim, fanatical and silent character of the Breton peasant and fisherfolk of the district. All ornament and richness are concentrated on the church, and the houses are almost without character, with granite walls and low-pitched slate roofs, built to withstand the winter gales and the rain, frequent even in the summer months.

Far beyond, at the meeting place of the Atlantic and the Channel, only approachable by a perilous passage strewn with rocks and submerged reefs, stands the Isle of Ushant, the outpost of Europe. Here one seems remote from modern times; all the inhabitants still wear their distinctive dress, and the women, old and young, wear their hair flowing over the black silk scarf which covers their shoulders. Here, too, the sheep are no bigger than a St. Bernard dog, and the cows are of a small and curious breed; no tree grows on this small and rock-bound island, alternately shrouded by a pall of sea fog or swept by Atlantic gales and driven spray.

The small town of Lampaul consists of granite cottages, huddled together as if for mutual protection from the elements, and a church with an elaborate but rather poorly-designed western tower. The whole place is dominated by the great wireless station with its twin towers of lattice girders, rising some hundred feet or more above the buildings below.

In the south, climate, customs, and local materials are in striking contrast to the granite of the north. At Quimper—a town full of interest to the architect—stone, brick and half-timber buildings add variety and charm to the place. The cathedral is again the dominating feature, and one can scarcely believe that the fine spires were only completed by that distinguished architect, M. Bigot, in the early part of the last century.

Many of the surrounding villages and towns have much of interest, such, for example, as Pont l'Abbé, with its curious early Renaissance street fronts and a finely proportioned wing to the old chateau, built at a later period. The charm of the coast and such places as Quiberon and Belle-Isle are too well known to need any comment, but farther to the south-east Vannes, the chief town of the Département du Morbihan, is certainly worth a visit. Here the local tradition is less strongly marked, and an excellent limestone has led to the adoption of a more formal and dignified type of building, remarkable for the excellence of its proportions and the refined detail of cornices and mouldings. Turning now towards home, by way of Le Mans, with its fine cathedral and well-planned streets and squares, and making a brief halt at Lisieux—that favourite haunt for artists of all lands—one cannot resist the light and shade and prosperous, yet restrained, exuberance of the entrance gates and piers in front of the old Hotel de Ville: a delightful picture, as seen against the mellow russet tones of the old brick and stone walls of the *cours d'honneur*.

Among the lesser known towns of the old province one may conclude with a reference to Gournay—a sleepy old-world place, yet also famous for its cream cheese, which imparts a fragrance of unmistakable pungency to the whole town, from the railway station to the big factory some miles away. In the eighteenth century Gournay-en-Bray was evidently a town of some repute and there are many interesting houses and business premises which date from this period. In the central "place" stands a monumental fountain of original design and charming detail; from the inscriptions on the four sides one learns that "during the reign of Louis XVI and the administration of MM. Badin, Mayor; Bigot Duvauroux, Lieut. du Maire; Ledicte (?), Duclos, Procureur du Roy; Maurice et Duhamel, Echevins; Annequin et Delaude, Cons; Chauvin, Greffier: this fountain was erected by virtue of Letters Patent of the King, ratified by Act of the Parliament of Rouen, under the care and supervision of M. Honfleur, *Intendant du Roy des Ponts et Chaussées*, MDCCLXXX," and that it was erected to the memory of M. Thiroux de Crosne, *Intendant de Rouen*.

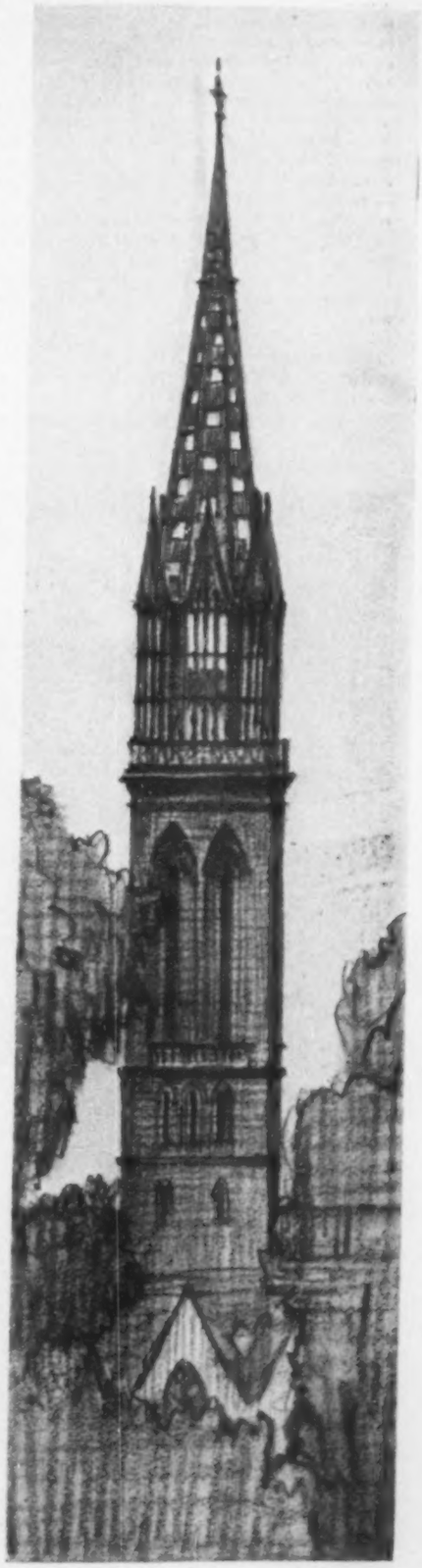
The delightful "Porte de Paris," with its two little gate-houses, probably dates from the same period, and may also be due to the plans of M. Honfleur. One cannot but regret that the modern descendants of this *Intendant*, the Engineers of the *Ponts et Chaussées*, or our own Borough and Municipal Engineers, have not the same architectural knowledge and good taste as their precursor in the days of Louis XVI.

Goldsborough Hall.

The old Elizabethan Yorkshire home of Princess Mary and Viscount Lascelles has almost been reconstructed internally. For six months the builders have been at work making separate entrances to some of the rooms, and restoring a recessed window to a room in the south-west corner. The room which has a rich Jacobean moulded plaster frieze will, it is supposed, become the Princess's private sitting-room.

Chesterfield's Crooked Spire.

The architect in his report upon the crooked spire says the external appearance of the spire is remarkable, but the internal is far more so from a constructional point of view. The result of a plumbing of the spire taken recently was as follows: Inclination to the south, 7 ft. 6 in.; to the south-west, 7 ft. 10 in.; and to the west, 3 ft. 2 in.; and comparing these figures with those taken in 1842 it appears the deflection to the south has increased 12 in.



Spire, St. Pol de Leon, Brittany.

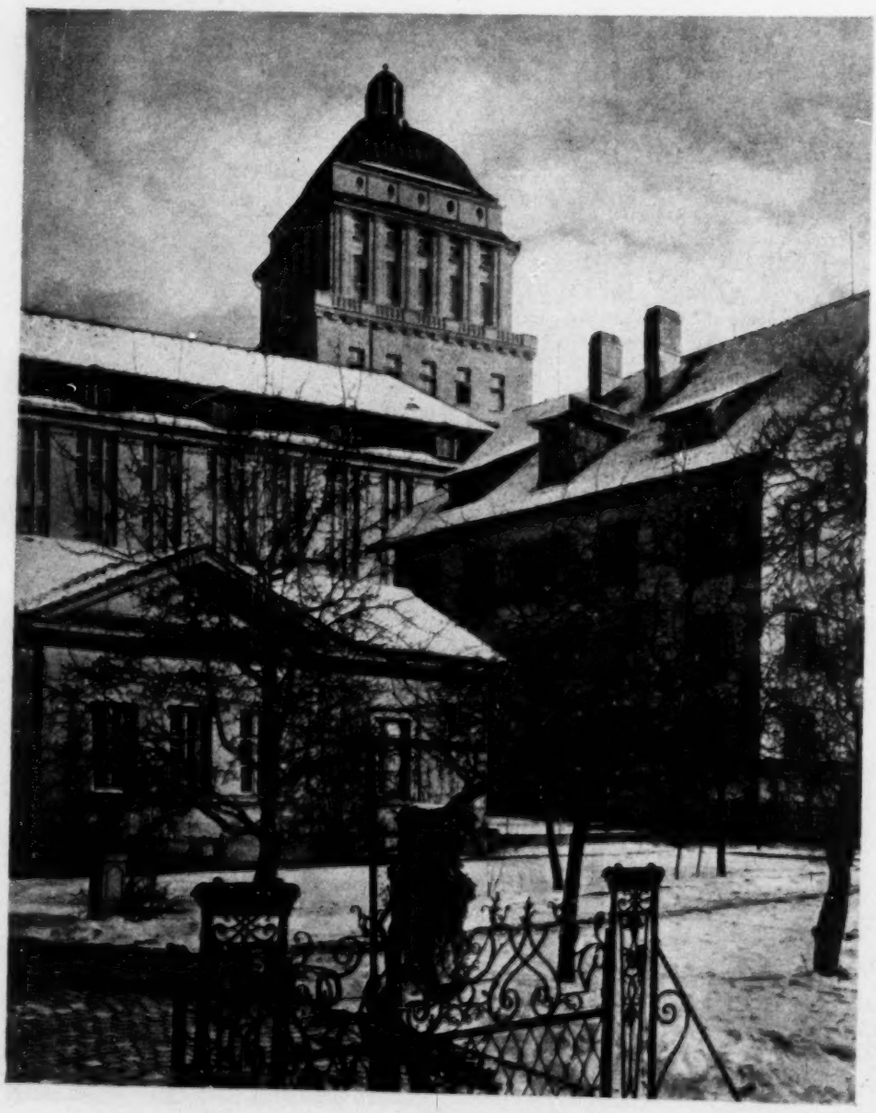
From a Sketch by LIEUT.-COL. H. P. CART DE LAFONTAINE, A.R.I.B.A.

THE UNIVERSITY OF ZURICH.

BY A SWISS CORRESPONDENT.

THE architects of the University of Zurich, Messrs. Curjel & Moser, were faced with the exceedingly difficult problem of giving prominence to their new building in spite of its being placed alongside and at considerably lower level than the Polytechnicum, a well-known piece of architecture completed in 1866 by Gottfred Semper. Semper had the advantage of being able to place his building on level ground, and, owing to its open and elevated position, make the façade dominate the city. He could, therefore, design a long, rectangular, clearly symmetrical building, the pronounced horizontal lines of which were accentuated by the contrast between the heavy rustica of the ground floor and the plain finish of the two upper floors. Support was given to this horizontal development by projecting wings and the richly decorated centre portion, which latter seems to conceal the fact that the Polytechnicum as a whole is designed along extremely modest and unpretentious lines. It represents a mixture of the severity and strength of the old Florentine style and the soft lines of the Biedermeier period.

For the University a complete departure was to be made from the style chosen by Semper. The disposition of the ground called for a different distribution of masses, as the site was on a slope broken by a small ravine. This latter was transformed into a garden, at the back of which the main entrance was placed. The Biological Institute, with its separate entrance from the north, was arranged in line with the Polytechnicum, and the University College proper moved backwards so as to get almost on level ground. A rectangular plan was thus secured, the outline of which is in harmony with the façades of the Semper building. A different solution would no doubt have resulted in a disruption of design, and would have produced subordination instead of co-ordination of the two buildings. The total length of the façade facing the city exceeds only slightly the length of the façade of the Polytechnicum, and the tower, with its prominent cupola, which corresponds to the richly decorated centre portion of the Semper building, tends to adjust visually the difference in levels of the two blocks.



VIEW FROM STOCKARGUT.

University of Zurich. MESSRS. CURJEL & MOSER, Architects.

The spirit of modern architecture, as well as the utility of the building, made it imperative to drop completely the Renaissance style, which in Semper's days was regarded as the perfection of architectural treatment.

The two blocks of the new building connected by the tower are similarly designed externally as well as internally, a large glass-covered court being surrounded by galleries serving the lecture theatres and the preparation rooms.

The court of the Biological Institute has walls of plain white, interwoven with grey and yellow, and gives, with its straight lines, a very bright impression. An effective contrast is thus obtained with the massive vaulted entrance halls and staircases, with their weighty balustrades. The plain walls of the College court reflect a monumental serenity. The openings on the ground floor are square and subdivided by small Roman columns, while on the upper floors wide semi-circular arches are provided. The main staircase divides the lengthy rectangular court, into which it cuts a half-circle on one side. It is beyond doubt that this court, with its arched skylight, produces a very impressive achievement of modern interior building. It would lend itself exceedingly well as a dignified reception hall, and it must be regretted that it could not be retained for this purpose, as the archæological collection has been housed therein. The distinctive architectural beauty of this court is enhanced by its colour. The walls have a light-red tint, with soffits in white. The rear walls of the galleries have doors painted different colours for each floor, and are kept in a deep-red tint similar to that of Greek vases.

At any point all the galleries may be overlooked, and the inflexion of the main staircase provides an indication as to the position of the principal lecture theatre and the hall. Wherever one walks throughout the building, instead of plain and dreary passages are found galleries affording ever-changing vistas of a brightly coloured room, restful and refreshing to the eye. Under artificial light the court develops new attractions. In daytime it gives light to all the galleries; and at night, being left without illumination, light is projected from the galleries, dark and light thus effectively reversing position.

Entering a lecture theatre the result of the subdivision of the façade is immediately realised in the abundance of light which floods the whole room—the impression of being confined within walls disappears. Large amphitheatrical lecture halls have not been provided, the largest in the Biological Institute seating 300 persons. The tendency of the college is to confine lectures within reasonable limits in numbers, in order that the students may not have to forgo intimate contact with the lecturers. The new building accentuates this departure from the conventional form of teaching in so far as predominance has been given to the numerous preparatory rooms and laboratories, all fitted with special libraries, where the students are led to participate in research work with the object of complementing the lectures by practical application.

The aim of the scientific lecture of to-day is towards visual perceptibility, requiring the installation of means for the projection of lantern slides. Such installations have been fitted to most of the lecture theatres. The decorations to these latter consist merely of plain panelling, in colours varying from room to room. Greater consideration has been given to the Provost and Senate rooms, both in the panelling and furniture, but a comprehensive decorative scheme is only to be found in the hall which crowns the east façade of the building, lighted by seven tall, arched windows. It is lined with marble of grey, black, and red tints, the various panels being surrounded by distinctive black and yellow lines. The two side walls support

DOOR OF PRINCIPAL'S ROOM.

University of Zurich.

balconies resembling old Italian music galleries, one of which is fitted with an organ, a present made to the University. The effect of the whole room centres on the chair, the background of which is to be filled by a large picture by Hodler, occupying the whole space from door to door.

The collaboration of all the artist-craftsmen connected with the new building has borne excellent fruit. As long as detail work consisted of a combination of copies workmen were equal to requirements, but with altered conditions new problems arose which had to be solved by new means, thus calling upon the artist craftsman to study the architects' aim in the endeavour to co-ordinate their work to the general conception.

A large staff of artists have been connected with the embellishment of the building, and the completeness of thought given to all details may be illustrated by an instance in the adaptation of heating appliances to the general structure. The illustration given on p. 39 shows the wind-screen of the main entrance door, formed in an unobtrusive way of vertical heating-pipes.

Every part of the internal equipment received the same careful attention. The design and execution of each department of domestic engineering was entrusted to specialists, an important feature being the heating and ventilating installation, which was placed in the hands of Sulzer Brothers, of London. By an invisible hand operating from a central control chamber conditions of temperature and air are regulated in all parts of the building; thus variation due to change of wind or to the number of occupants are recorded at the central station, where provision is made to meet these demands.

The completion of this modern University has been a stepping-stone in the educational progress of the canton of Zurich. With their total population of about 510,000 they have voted the whole of the necessary funds for the erection, equipment, and endowment, thus worthily continuing the foundation made in 1832. The University is to-day accommodating over 2,000 students, with ever-increasing demands upon its space.

THE OUTLOOK FOR ARCHITECTS.

BY AN ARCHITECT.

ARCHITECTURE has never required a longer or more expensive training than it does at present, and yet, what are the prospects of a young "qualified architect" being able to earn a livelihood when he has completed his five years' training? During his first few years as an assistant he has never been able to earn more than a clerk, and if he is lucky he now earns only a little less than a bricklayer. The profession cannot afford to pay more. Suppose the young architect does not enter an office, but sets up in private practice on his own account, can he expect to get a reasonable amount of work? To answer this we must compare the conditions existing to-day with those that prevailed before the war. To begin with, he suffers even more than other professional men from the high cost of living and heavy taxation, which have reduced what may be called "the landed classes" to a condition in which they are utterly unable to keep up large family seats, and fine country houses are consequently for sale in every locality at less than a quarter the price that would be required to build them. Death duties will further impoverish the families owning such houses, and there will result a constant flow of old houses into the market, and any redecoration that may be required will often shortsightedly be put in hand without the aid of an architect; hence country-house work (as apart from cottages and bungalows) is unlikely to revive for at least a generation.

Commercial work on a big scale must of course revive with increased prosperity in trade, but large business companies, even when they realise the value of employing architects to design factories, naturally consult well-known firms, as it is easier to justify such a selection to shareholders; and the same applies to big business premises. Thus the prospect of an unknown young architect getting any of this work is remote, and, if he has no capital, his chance of getting into partnership in a well-known architectural firm is equally poor, there being in any case not enough of such partnerships to supply a tenth part of the deficit.

In respect to hospitals, these are terribly short of funds, and are rightly economising wherever possible by erecting light semi-permanent structures to supplement existing hospital buildings, the latter being used chiefly for administrative purposes. As to institutions generally, while there will be a slightly enlarged field in the erection of new schools, there will exist a more than counteracting influence in the conversion of redundant country houses to various institutional purposes; and these conversions, as we have seen, are likely too often to be carried out under the direction of someone who cannot be called an architect. Church work of a permanent nature, for obvious financial reasons, does not look hopeful, war memorials must soon come to an end, and Government jobs are practically over.

All the more prolific sources of work that existed for the average architect in pre-war days have either dried up or depend more than

FOUNTAIN IN HALL ON GROUND FLOOR.

University of Zurich.

VIEW FROM ZURICHBERG.

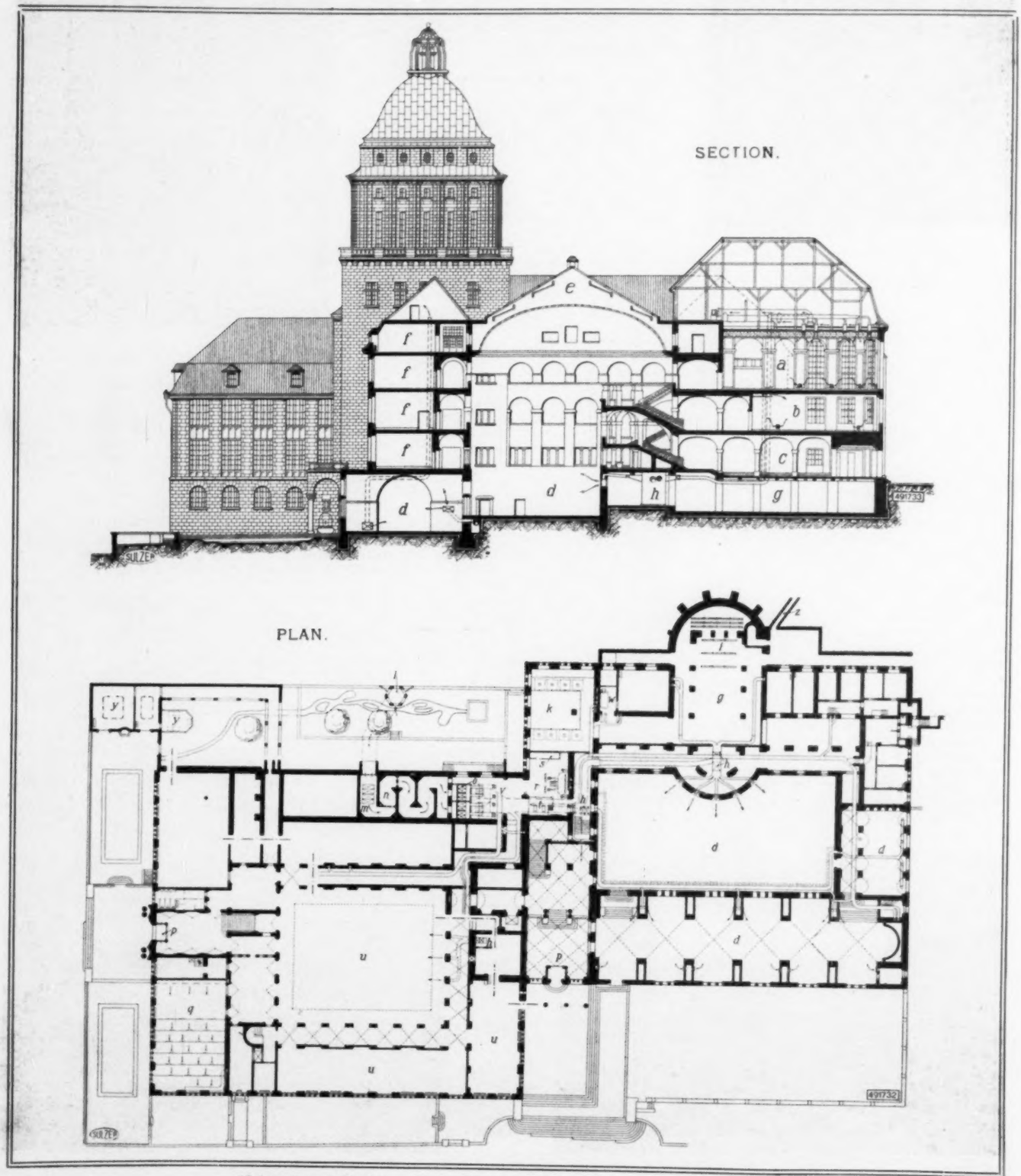
FROM THE NORTH-WEST.

University of Zurich. MESSRS. CURJEL & MOSER, Architects.

ever upon established prestige and private influence, and the waste and disappointment that are likely to be involved in entering for overcrowded competitions must apparently be faced by the young man without much capital or influence; in such competitions among numerous entrants, if he gets placed once in ten attempts he will do well. It is not being pessimistic to say that his prospects for the next few years are decidedly poor; not because the country can properly do without his services, but because it has grown accustomed to think it can, and to imagine that practical needs are one thing and architecture another.

The only solution to the present deadlock would appear to lie in concentrating upon town planning and the other activities associated with it, such as the lay-out and erection of small houses and shops. Sooner or later there must be a prodigious volume of such work, and the architect should be able to find employment, local and otherwise, in this new field of activity. Whether he does so or not depends solely upon the architects' own initiative, and on whether they can show that their advice is worth seeking and paying for; such work would have the additional merit that the architect, in undertaking it, would not be "treading on anyone else's toes." A suggestion recently made to the effect that progressive architects should form themselves into small groups or guilds, might here serve a useful purpose.

In the midst of our uncertainties, one fact at least stands out indisputable: the old order has passed, and the small architect must either quickly adapt himself to the new, or fade away elegantly in waiting for "normal times" to recur.



University of Zurich. MESSRS. CURJEL & MOSER, Architects. (*See p.* 12).

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ILLUSTRATIONS.

Liverpool Cathedral.

We give this week some views, specially taken for *The Builder*, of Liverpool Cathedral, now being built from designs by Mr. G. Gilbert Scott, R.A.

Zurich University.

An article on the new Zurich University (Messrs. Curjel & Moser, architects) is given on p. 12.

Banque Belge pour l'Etranger.

This building is in course of erection in Bishopsgate, E.C. It is a steel-framed structure, with ferro-concrete floors. The front to Bishopsgate is faced with Portland stone, the windows being in steel and plate glass. The contractors for the work are Messrs. John Mowlem & Co., Ltd., of Grosvenor Wharf, London, and the architect Sir Edwin Cooper, F.R.I.B.A. Mr. J. Whittaker is the clerk of works.

Premises in St. Mary Axe, E.C.

This building is being erected in St. Mary Axe and Bury-court, E.C., to house the various departments of Messrs. Spillers Milling & Associated Industries, Ltd. The building is steel-framed, with ferro concrete floors, and faced with Portland stone. All windows are to be steel, with plate glass. The contractors are Messrs. Higgs & Hill, Ltd., of Crown Works, Lambeth, and the architect is Sir Edwin Cooper, F.R.I.B.A. Mr. W. G. Rule is the clerk of works.

Bank in Piccadilly.

Mr. T. C. Whinney, F.R.I.B.A., is architect for the London, City & Midland Bank in St. James's; the elevations are by Sir Edwin Lutyens, R.A.

House for the Rt. Hon. D. Lloyd George.

The drawings show Mr. Lloyd George's new house at Churt. The contractors for the building were Messrs. J. W. Woolnough, of 30, Sea Side-road, Eastbourne. The metal casements were supplied by Messrs. Henry Hope & Sons, Ltd., of Birmingham. An efficient and economical electric light plant was installed by Messrs. F. H. Wheeler, of Westminster, S.W. 1. The kitchen range was supplied by Messrs. Benham & Sons, of London, W. 1. The sanitary fittings were supplied by Messrs. John Slater, Ltd., of Stoke-on-Trent. The decorative plaster work to the large library was the work of Messrs. G. Jackson & Sons, Ltd., of London, W.

The architect is Mr. Philip Tilden, of 3, Pelham-crescent, S.W. 7.

Westminster Hall.

An article and further illustrations of Westminster Hall are given on pp. 31-36

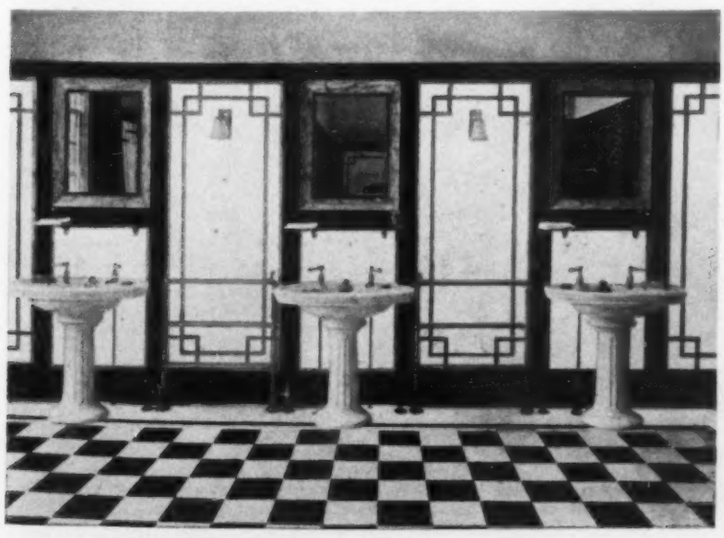
"The Builder" Calendar.

Our Calendar this year is a reproduction of a drawing by the late H. W. Brewer depicting Old Westminster Palace; this will be given in our next issue.

Nobel House.

This building, now the head office of Nobel Industries, Ltd., was at one time the fashionable Buckingham Palace Hotel, and, although the exterior shows little signs of alteration since the building was used as an hotel, except the new entrance doorway, the interior alterations involved in the conversion to its present purpose were of a very extensive character. The practice so common in American office buildings of exposing to view the working of the staff has been adopted as far as possible, and where divisions were considered necessary they have been constructed of screens glazed with clear glass. On the main floors these are constructed of teak, but the suite of Directors' rooms and board-room on the first floor are all finished in American walnut. The main staircase is also of teak with a bronze balustrade.

Messrs. Buckland & Haywood, FF.R.I.B.A., and Mr. J. N. Randall Vining, F.R.I.B.A., are the joint architects.



Nobel House: Lavatory Fittings.

MESSRS. BUCKLAND & HAYWOOD, FF.R.I.B.A., AND MR. J. N. RANDALL VINING, F.R.I.B.A., Joint Architects.

The general contractor was Mr. F. G. Minter of Putney, and among the sub-contractors were the following:—Bronze work in entrance gates and balustrade: Farmer & Brindley; Carving: Farmer & Brindley; Fireproof floors: Homan & Rodgers, Ltd.; Electric lighting: F. G. Minter; Electric fittings: F. E. C. Osler, Ltd.; Heating: Henry Hope & Sons; Fire hydrants: Henry Hope & Sons; Lifts: Waygood Otis; Fire-resisting glazing: British Luxfer Prism Syndicate; Sanitary fittings: Pontifex & Sons; Marble and mosaic pavings: W. B. Simpson & Sons; Wall tiling: Vitrolite Construction Co.; Telephones: The Reliance Telephone Co.; Strong-room doors: John Tann, Ltd.; Strong-room steel-shelving: Harris & Sheldon, Ltd.; Board-room furniture: Liberty & Co.; India-Rubber and "Rublino" floor tiling: Leyland & Birmingham Rubber Co.

War Memorial, Farnborough, Kent.

This memorial, which stands on a high ground to the south of the church, consists of a battered and buttressed terrace-wall, terminated by four sides of an octagon, forming a double terrace with steps leading up to a cross above. Under the coping of the wall is a frieze, consisting of two rows of name stones carved with the names of the fallen, one stone being allotted to each name. The cross stands on a recumbent Latin cross, and has a figure of St. George in a niche just below the arms, between which are carved roses, emblematic of England. The wall and terraces are built of local stone (Tunbridge Wells) and knapped flints; the quoins of the buttresses are of picked, dark mottled bricks and the set-offs of Bath stone, both matching those of the church; the name stones, copings and cross are all of Portland stone; the steps are old York and the crazy paving of the terraces of York, Somerset, Purbeck, and Hereford stones to lend colour. The builders were Messrs. Treasure Bros., of Orpington and Bickley, Kent. The cross was made by Mr. F. Horn, of Totnes, South Devon. The carving and figure of St. George are by Mr. J. B. Hunt, of Plymouth.

The architect is Mr. F. Harrild, M.A., A.R.I.B.A., of 57A, High-street, Totnes, Devon.

War Memorial, Church of St. Philip, Kensington.

This memorial was designed by Messrs. Cheadle & Harding, of No. 2, New-square, Lincoln's Inn, and was executed by Messrs. Wooldridge & Simpson, of Oxford. The sculpture in the centre panel and the lettering are the work of Mr. Esmond Burton, of Red Lion-street. The memorial, which is mainly in oak, is somewhat reminiscent of a fifteenth-century tomb, and is flanked by panels containing some 80 names. A considerable amount of colour is embodied in the scheme. The central panel in bold relief illustrates the life of St. Martin, the patron saint of soldiers, on whose anniversary the Armistice was signed. The picture is divided into three scenes: the first represents St. Martin as a Roman soldier giving half his cloak to a beggar; the central one represents St. Martin's vision, in which Christ appeared to him wearing the half of his cloak; and the third illustrates St. Martin's subsequent career as a missionary bishop.

MEETINGS.

SATURDAY, *January* 6.

Royal Institute British Architects.—Visit to the London County Hall.

MONDAY, *January* 8.

Architectural Association.—Mr. L. A. Turner on "The Workshop." At 35, Bedford-square, W.C.1. 7 p.m.

TUESDAY, *January* 9.

Liverpool Architectural Society.—Mr. T. A. Lloyd on "Housing Achievements." At 13, Harrington-street.

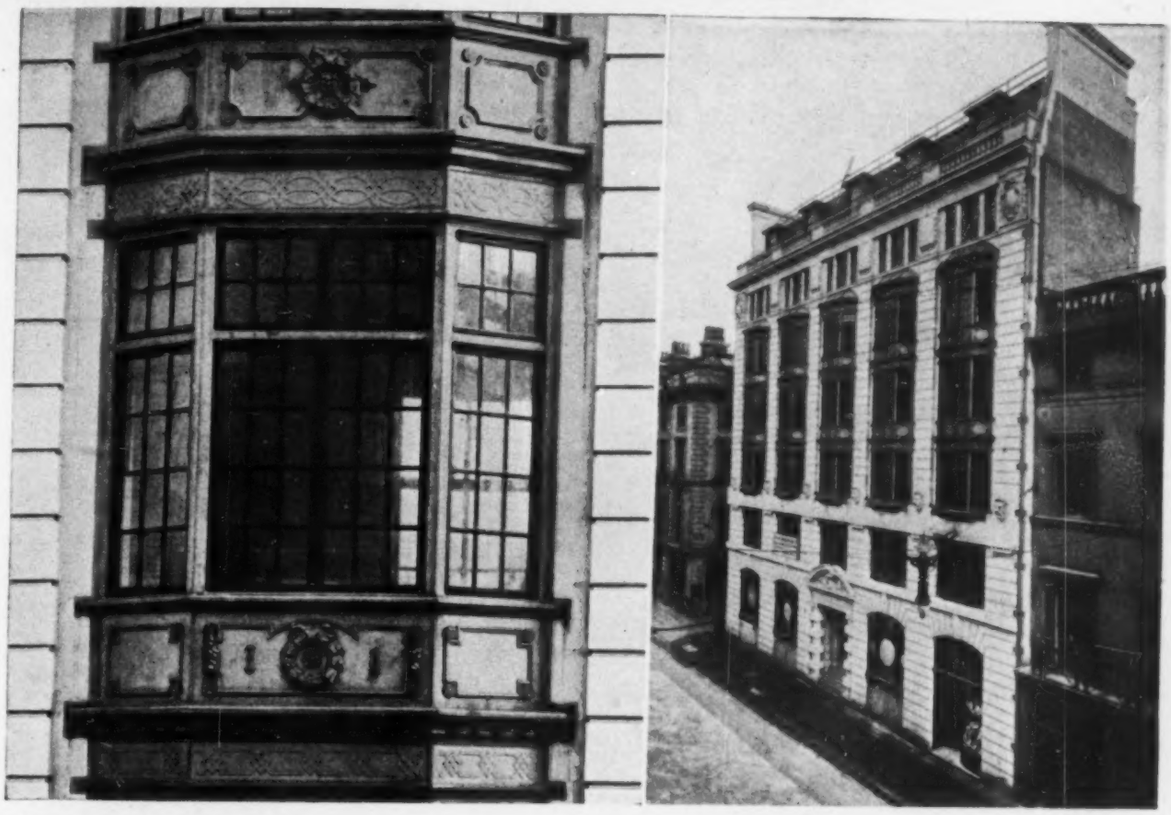
WEDNESDAY, *January* 10.

Manchester Society of Architects.—Mr. M. E. Webb on "As Others See Us." At St. Mary's Parsonage. 6 p.m.

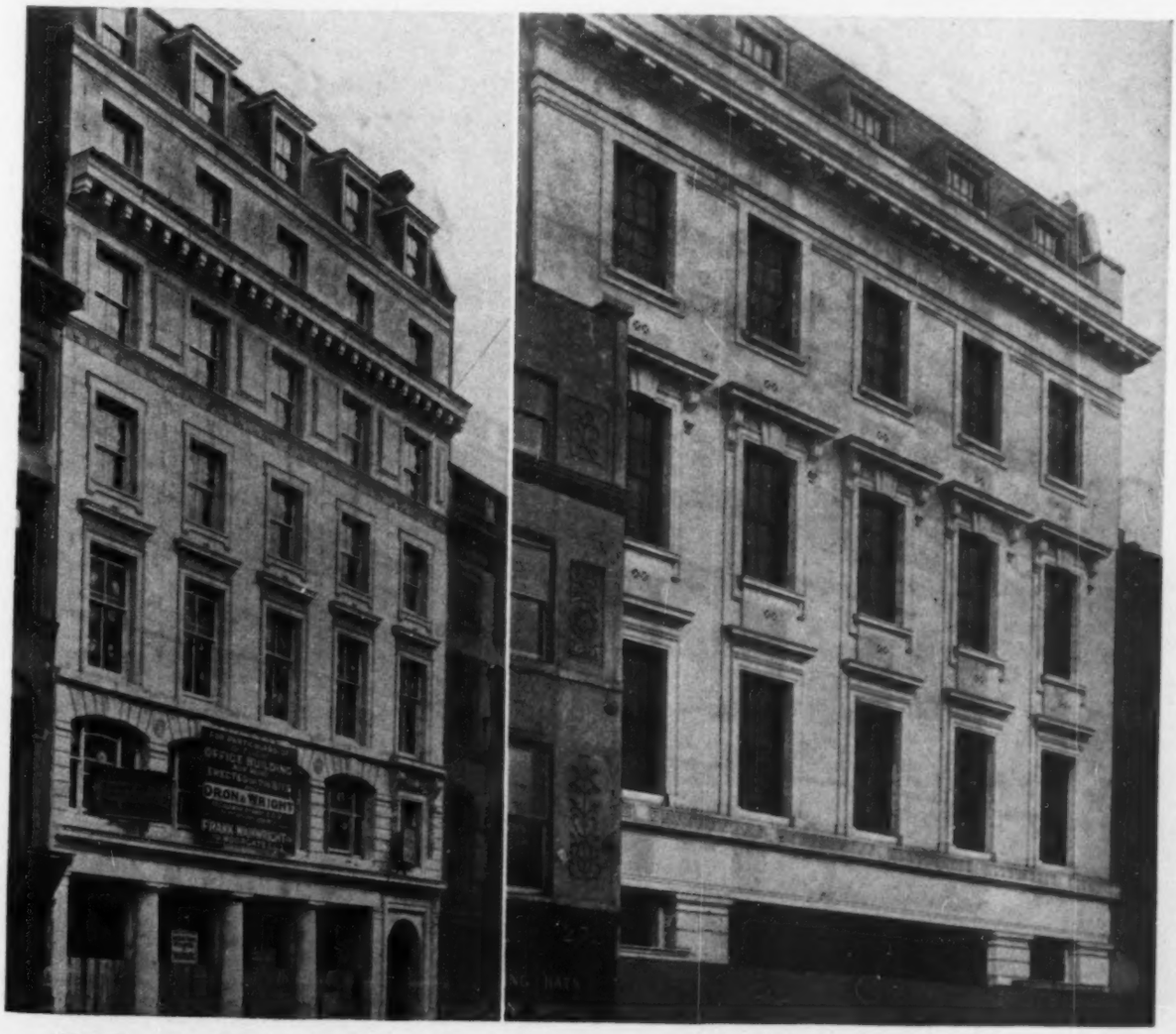
COX'S BANK, PALL MALL, S.W. MR. E. KEYNES PURCHASE, F.R.I.B.A., Architect.

AGRICULTURAL AND GENERAL ENGINEERS' BUILDING, ALDWYCH. MESSRS. GUNTON & GUNTON, Architects.

Some Recent London Buildings.



THE LICENSES AND GENERAL INSURANCE BUILDING, MOORGATE STREET, E.C. MESSRS. MARKS & O'DONOGHUE, Architects.



NEW PREMISES, MOORGATE STREET, E.C.
MESSRS. RICHARDSON & GILL, FF.R.I.B.A., Architects.

NEW TELEPHONE EXCHANGE, HOLBORN.
MR. E. CAPPER (H.M. Office of Works), Architect.

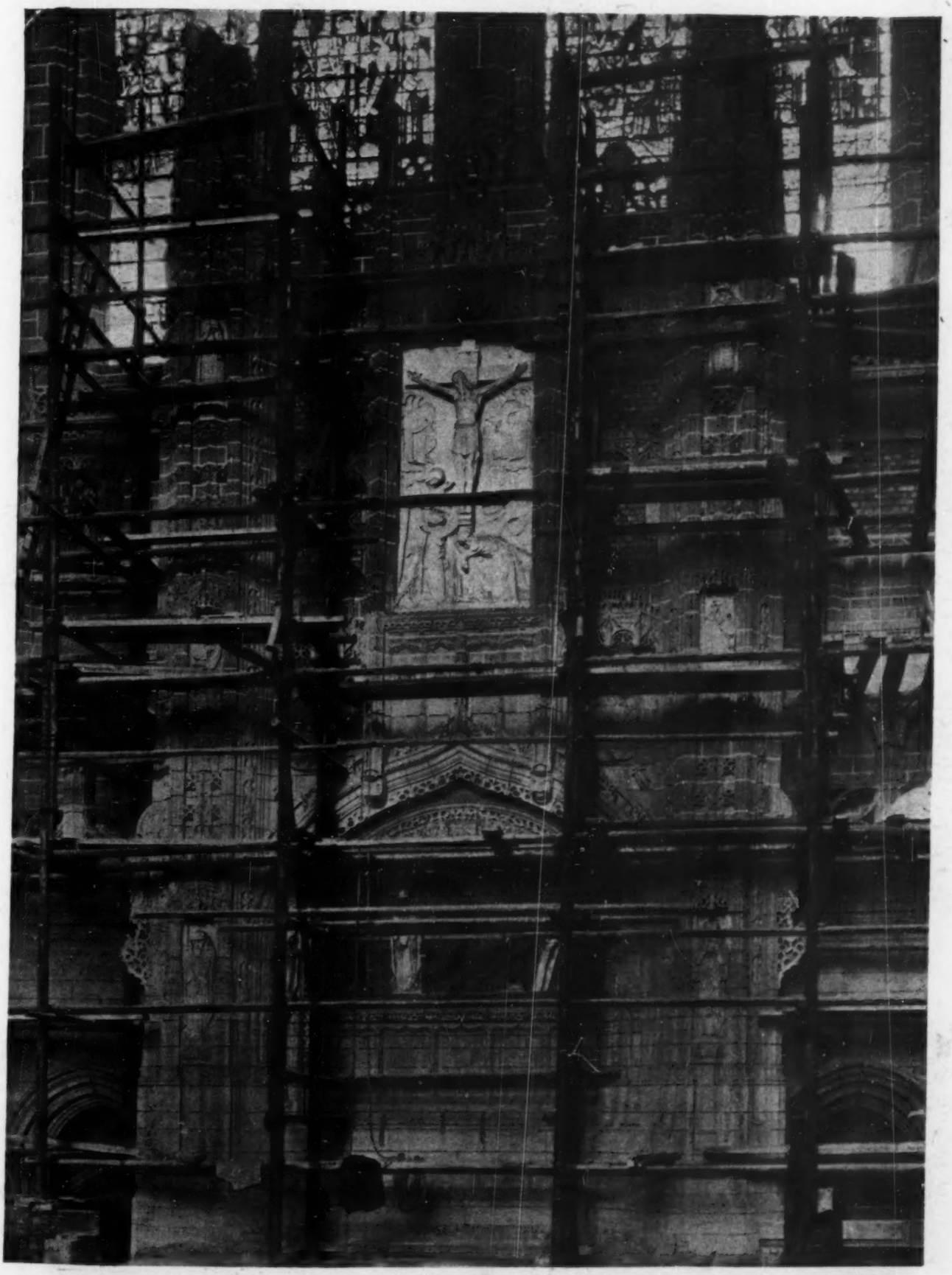
Some Recent London Buildings.

Barclay's Bank, Pall Mall East. Mr. C. J. Blomfield, F.R.I.B.A., Architect.

Building in Duke Street, St. James's.
Mr. W. Curtis Green, F.R.I.B.A., Architect.

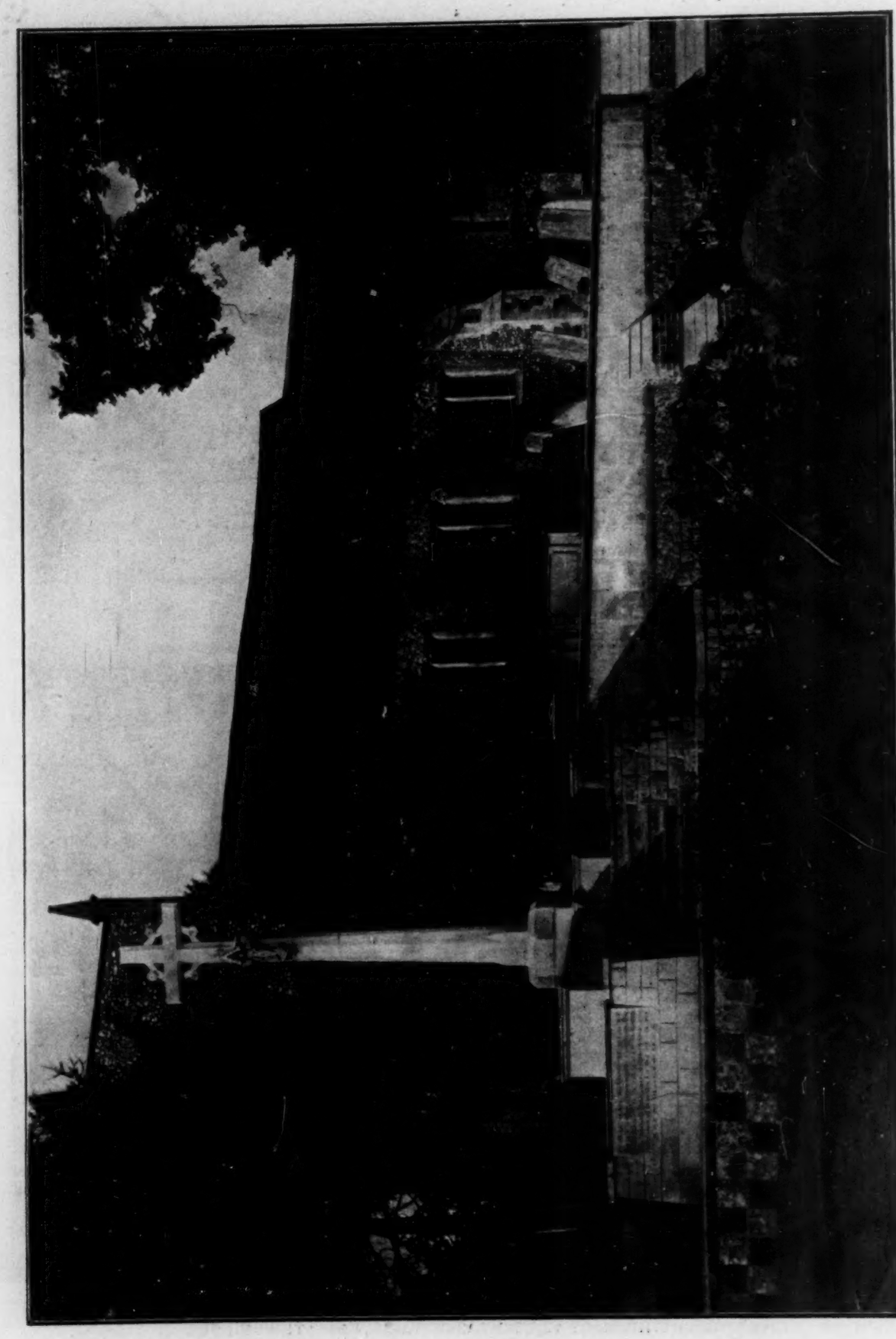
P. & O. Banking Corporation, Ltd.
Messrs. Collcutt & Hamp FF.R.I.B.A., Architects.

Some Recent London Buildings.

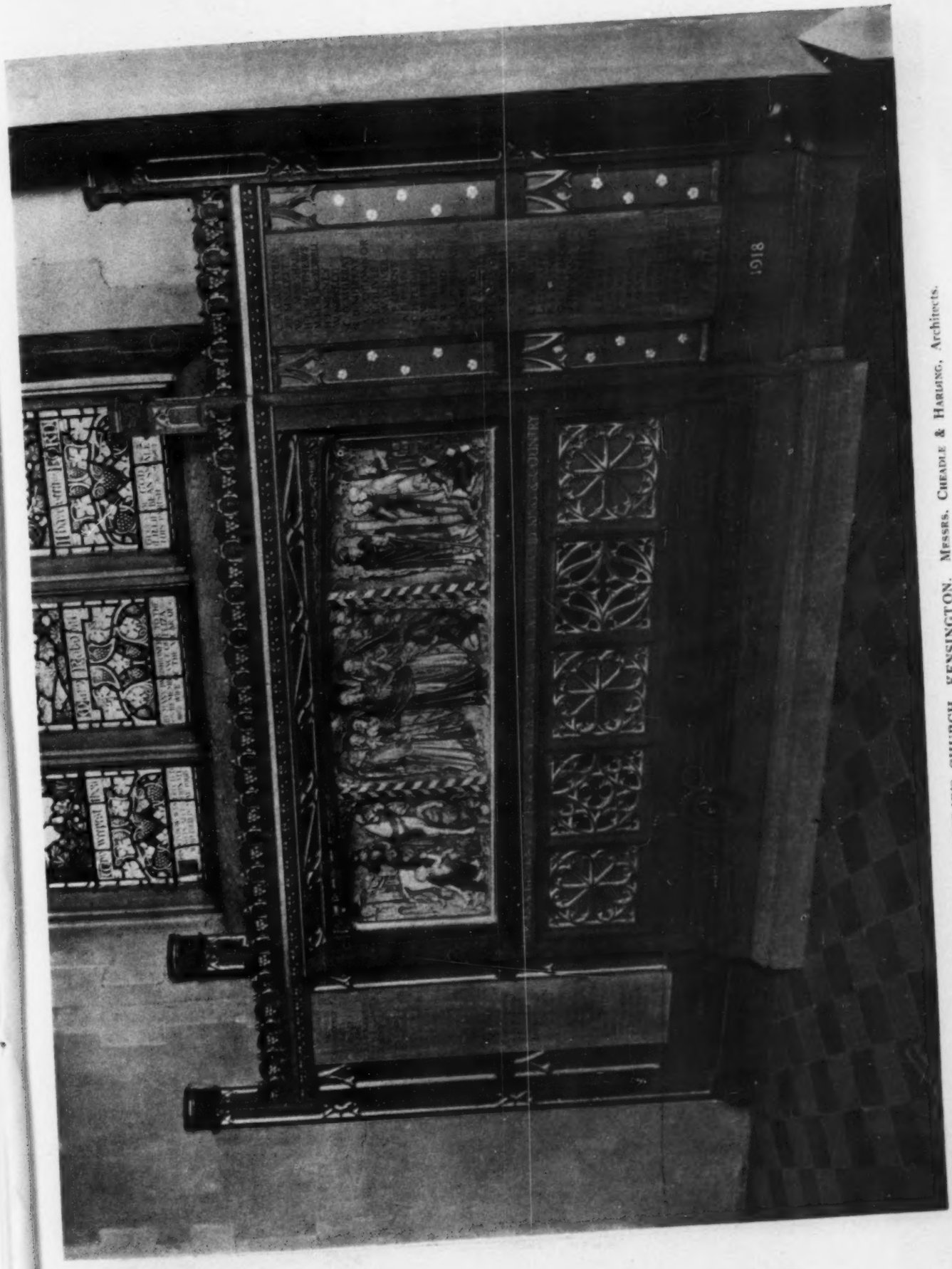


LIVERPOOL CATHEDRAL: A RECENT VIEW TAKEN FOR "THE BUILDER."

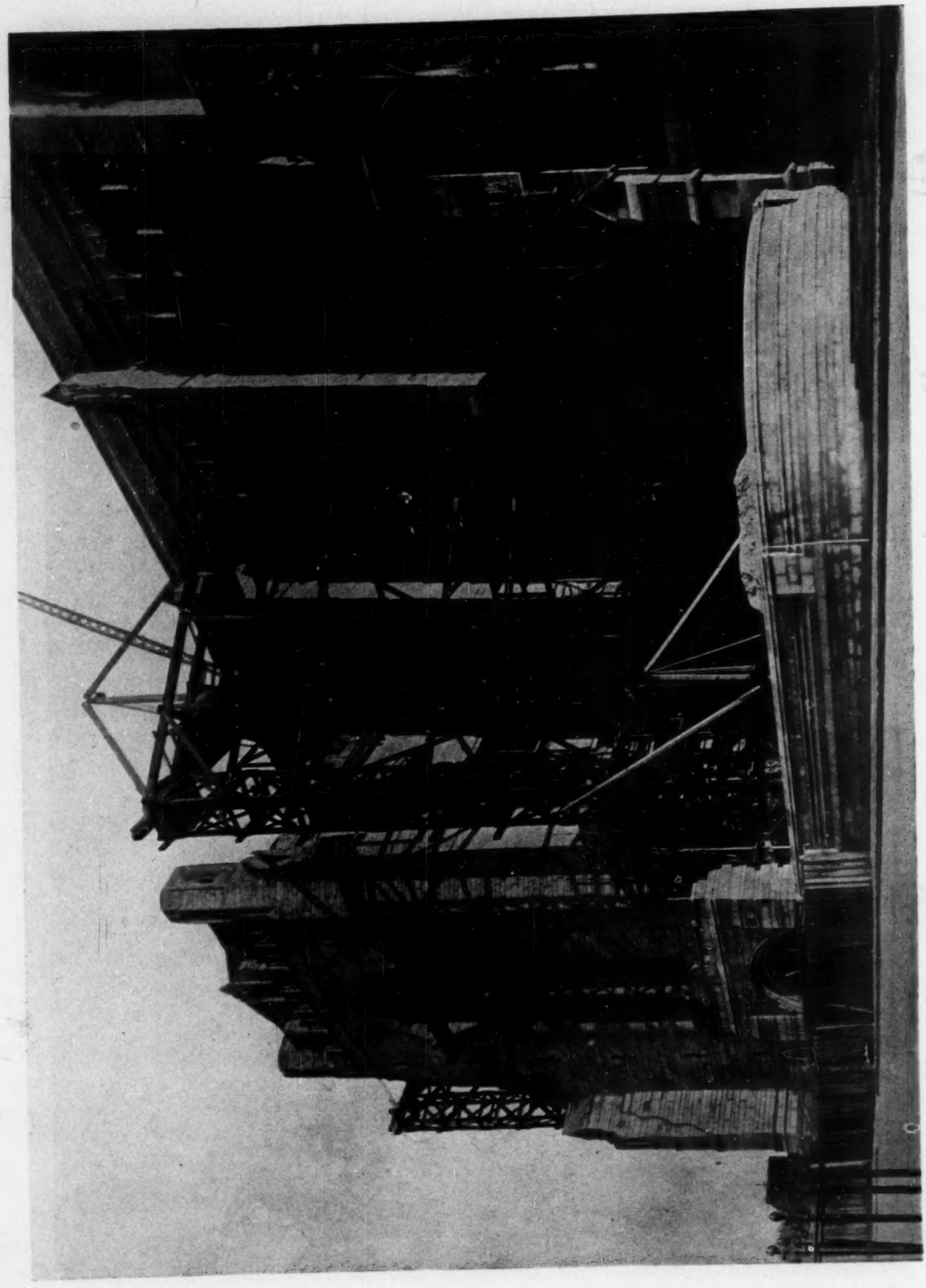
MR. G. GILBERT SCOTT, R.A., Architect.



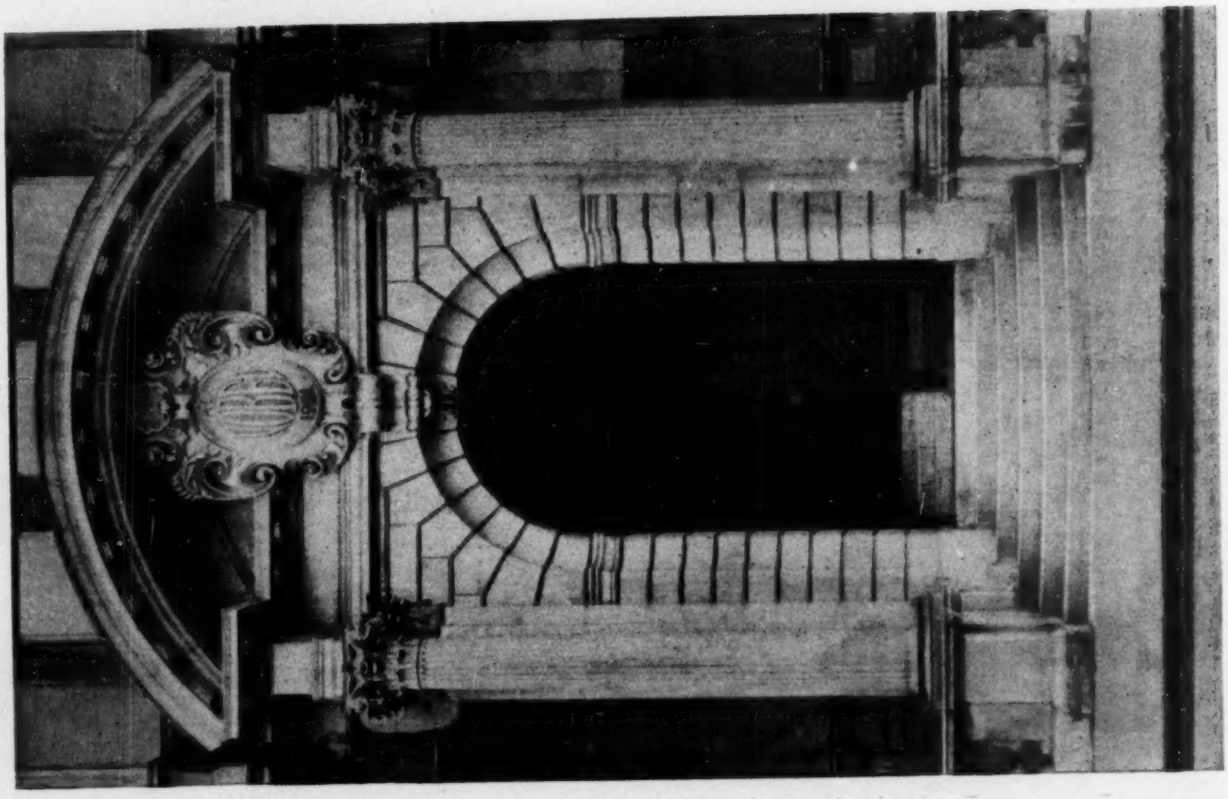
WAR MEMORIAL, FARNBOROUGH, KENT. MR. F. HARRILD, M.A., A.R.I.B.A., Architect.



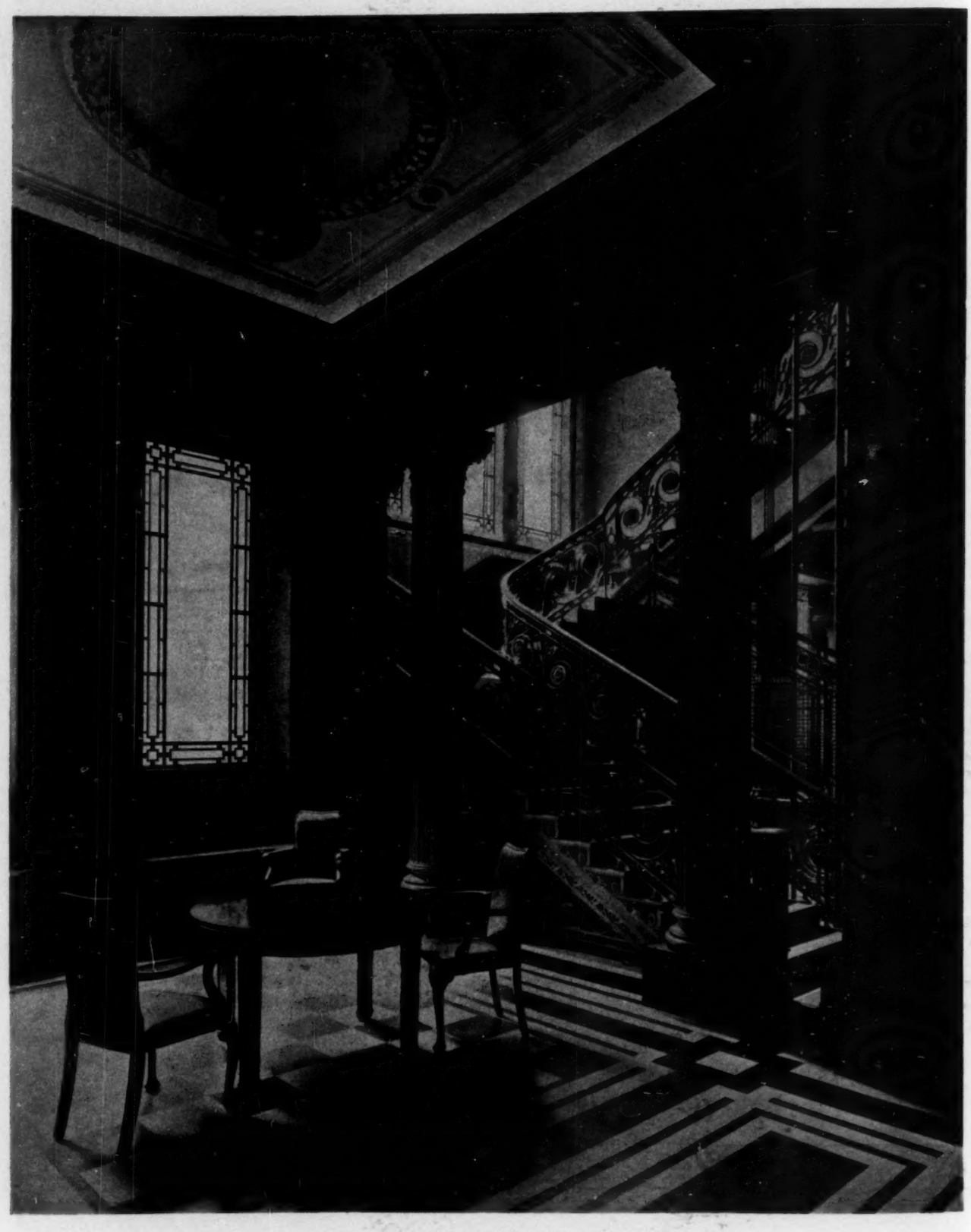
WAR MEMORIAL, ST. PHILIP'S CHURCH, KENSINGTON. MESSRS. CHEADLE & HARDING, Architects.



LIVERPOOL CATHEDRAL: A RECENT VIEW TAKEN FOR "THE BUILDER." MR. G. GILBERT SCOTT, R.A., Architect.



NOBEL HOUSE, BUCKINGHAM GATE, S.W. MESSRS. BUCKLAND & HAYWOOD, FF.R.I.B.A., and MR. J. N. RANDALL VINING, F.R.I.B.A., Joint Architects.



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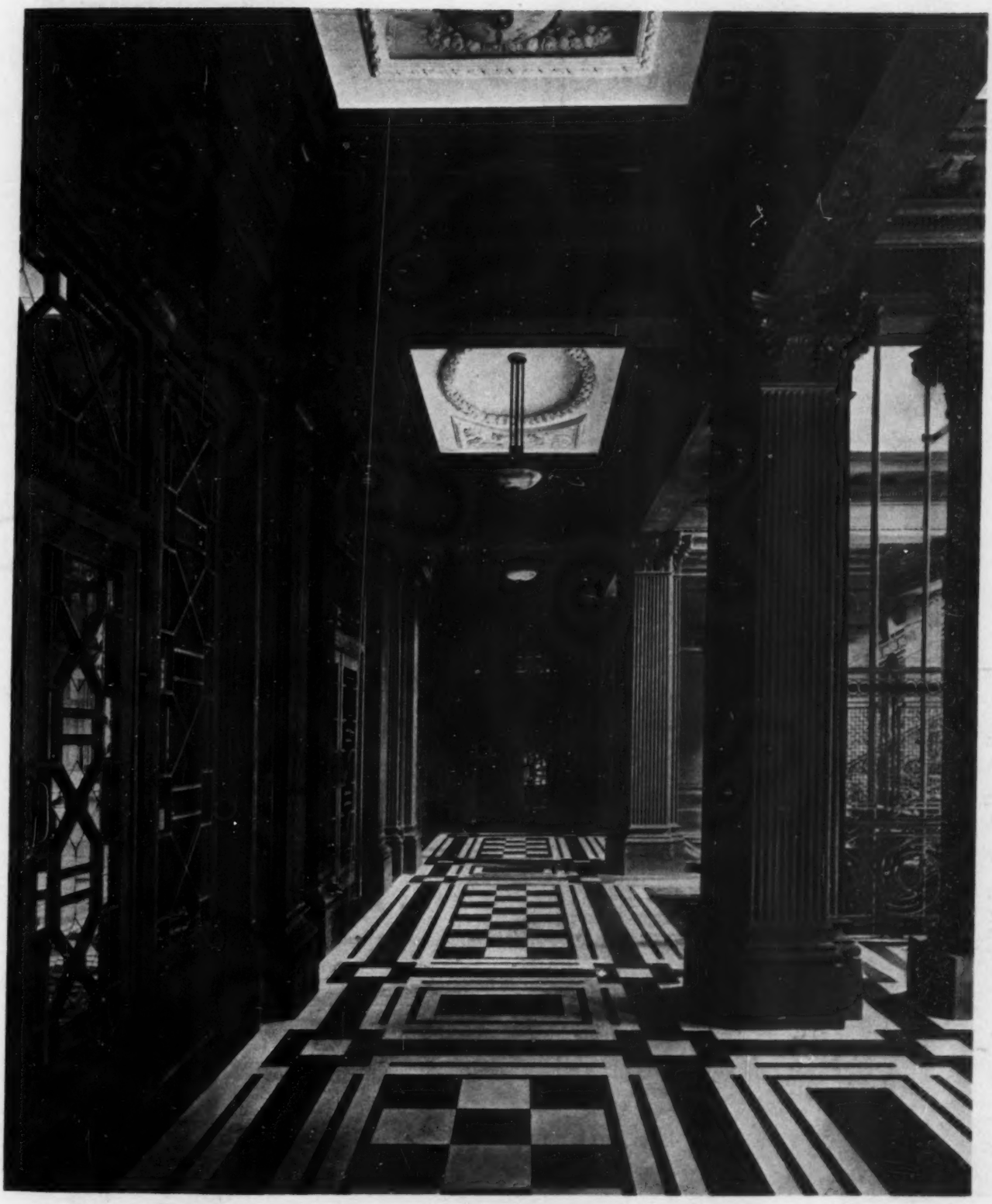

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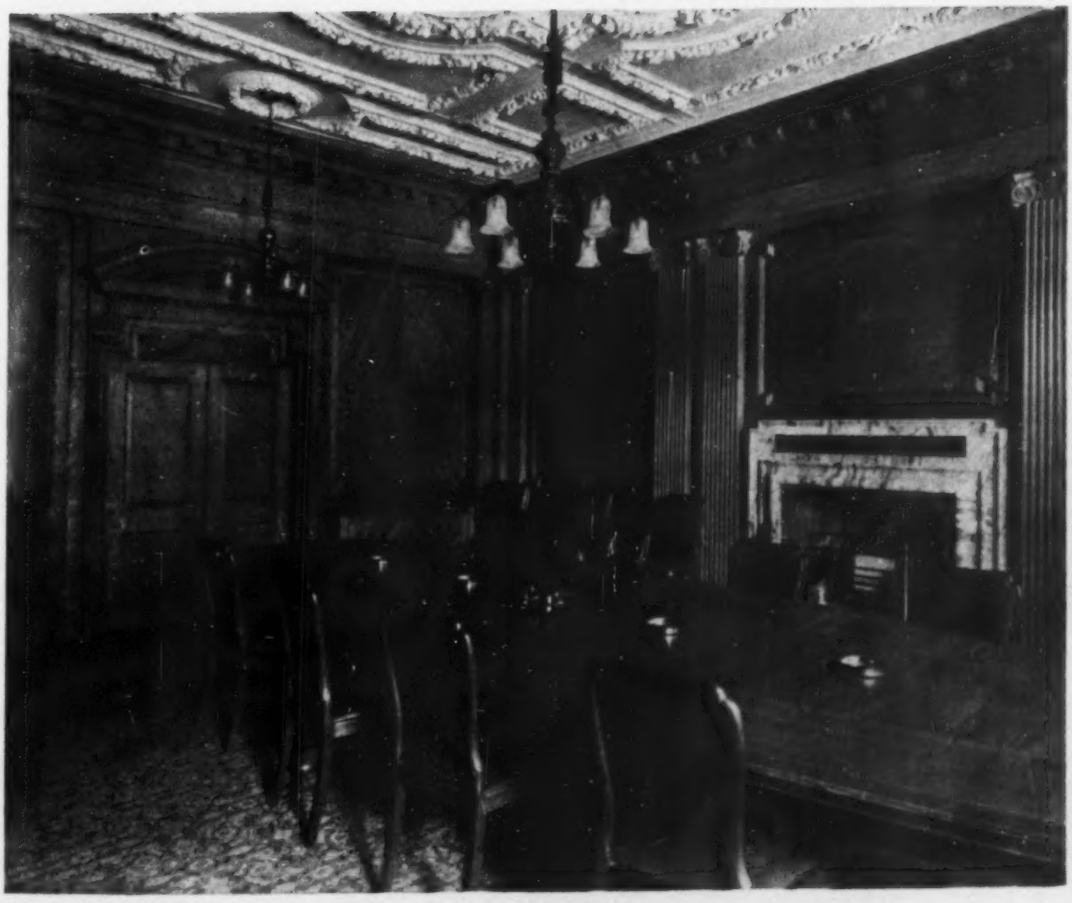

NOBEL HOUSE, BUCKINGHAM GATE, S.W.
MESSRS. BUCKLAND & HAYWOOD, FF.R.I.B.A., and MR. J. N. RANDALL VINING, F.R.I.B.A., Joint Architects.

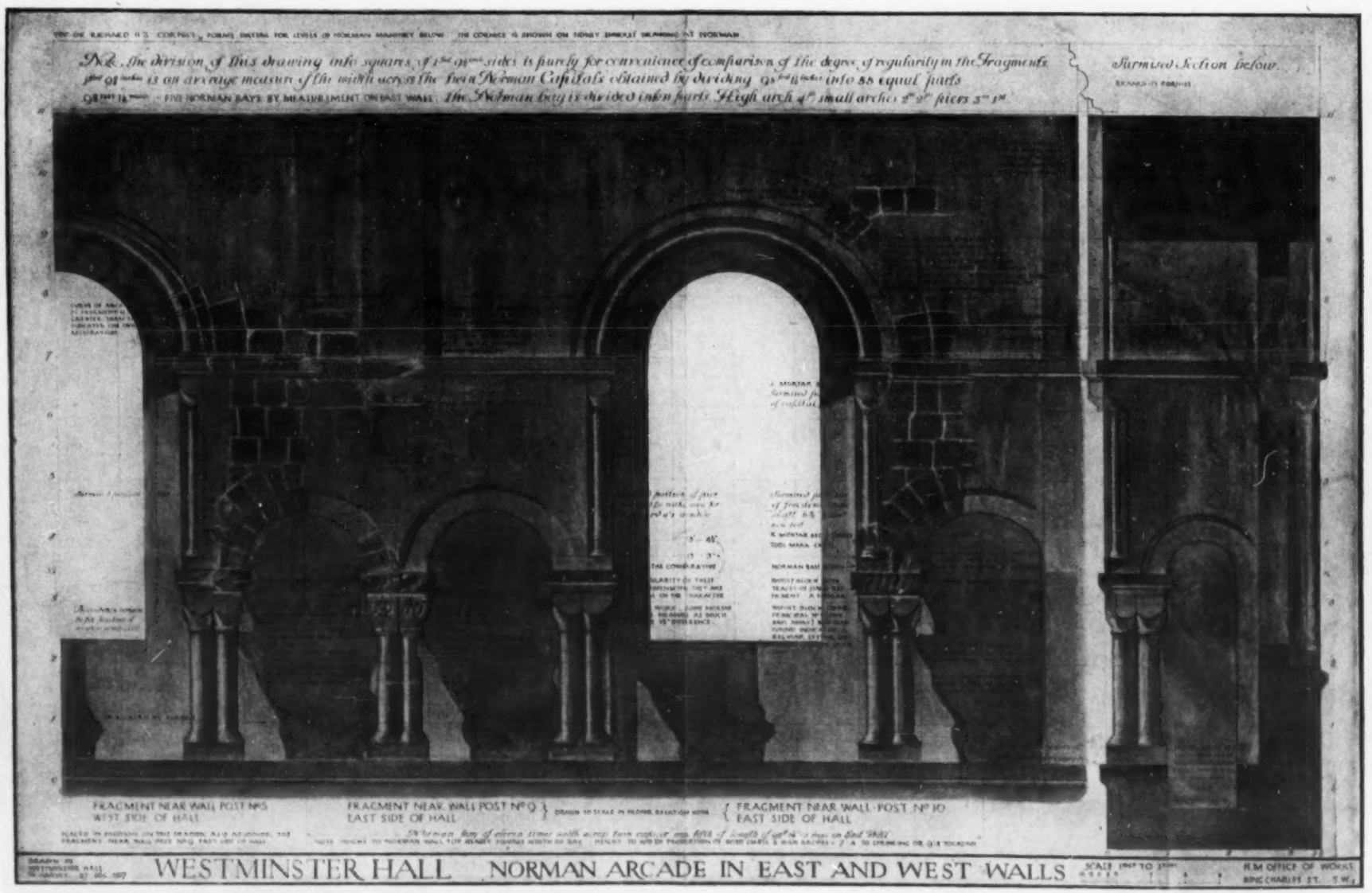
Note. the division of this drawing into squares of 1st 0ne inch sides is purely for convenience of comparison of the degree of regularity in the Fragments
1st 0ne inch is an average measure of the width across the face Norman Capitals obtained by dividing 9 1st 6 inches into 55 equal parts
Surmised Section below.
FIVE NORMAN BAYS BY MEASUREMENT ON EAST WALL. The Norman bay is divided into 6 parts. High arch 4 parts small arches 2 parts 2 parts piers 3 parts 1 part
FRAGMENT NEAR WALL POST N°5 WEST SIDE OF HALL
FRAGMENT NEAR WALL POST N°9 EAST SIDE OF HALL
FRAGMENT NEAR WALL POST N° 10 EAST SIDE OF HALL
WESTMINSTER HALL NORMAN ARCADE IN EAST AND WEST WALLS
H.M OFFICE OF WORKS KING CHARLES ST. S.W.1

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FIG. 11.—DRAWING SHOWING APPROXIMATE UNIFORMITY OF THE FIRST GROUP OF NORMAN FRAGMENTS FOUND. NO CONFIRMATION WAS DISCOVERED FOR THE CORBEL AND PILASTER STRIP SHOWN IN CONNECTION WITH FRAGMENT NEAR WALL POST NO. 9, NOR OF EXACT POSITION OF WINDOW SILLS, SHAFTS AND HEAD.

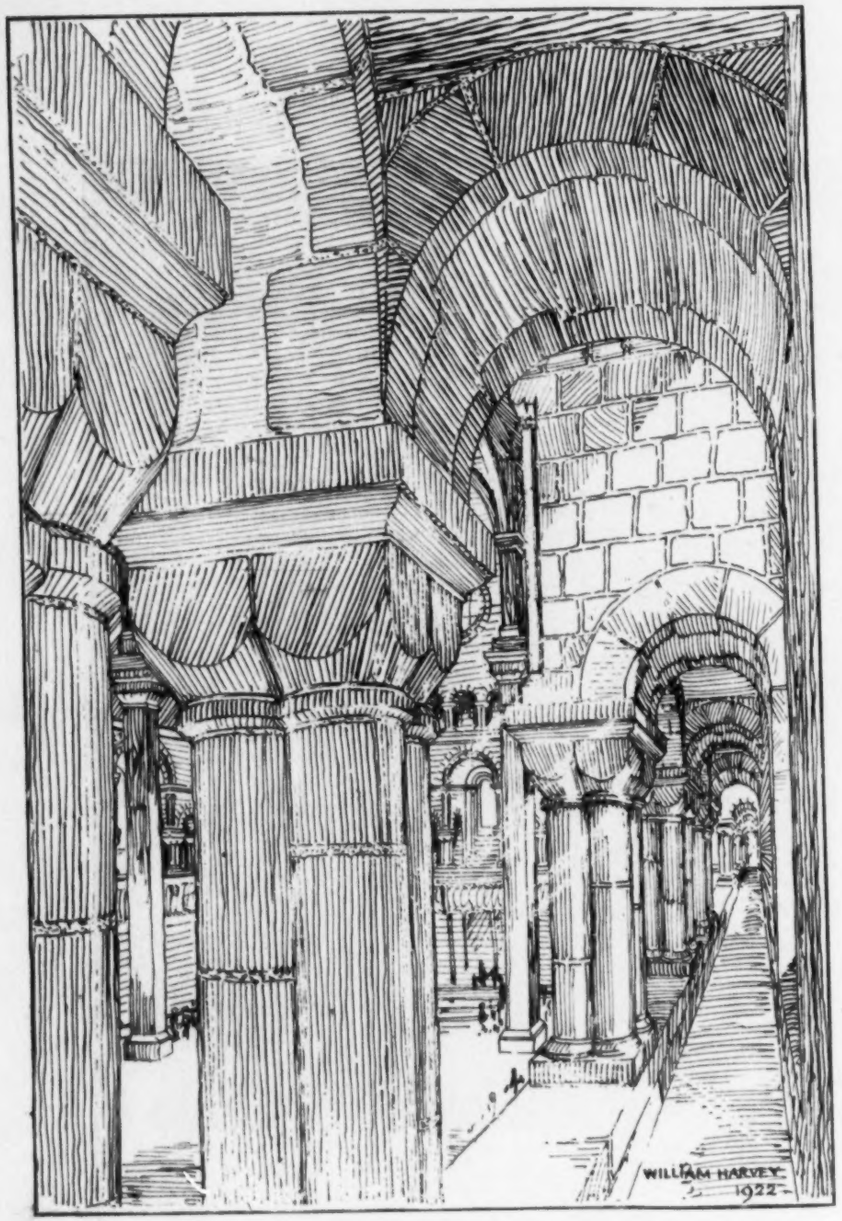

FIG. 13.—NORMAN PASSAGE. CONJECTURAL RESTORATION BY MR. WILLIAM HARVEY.

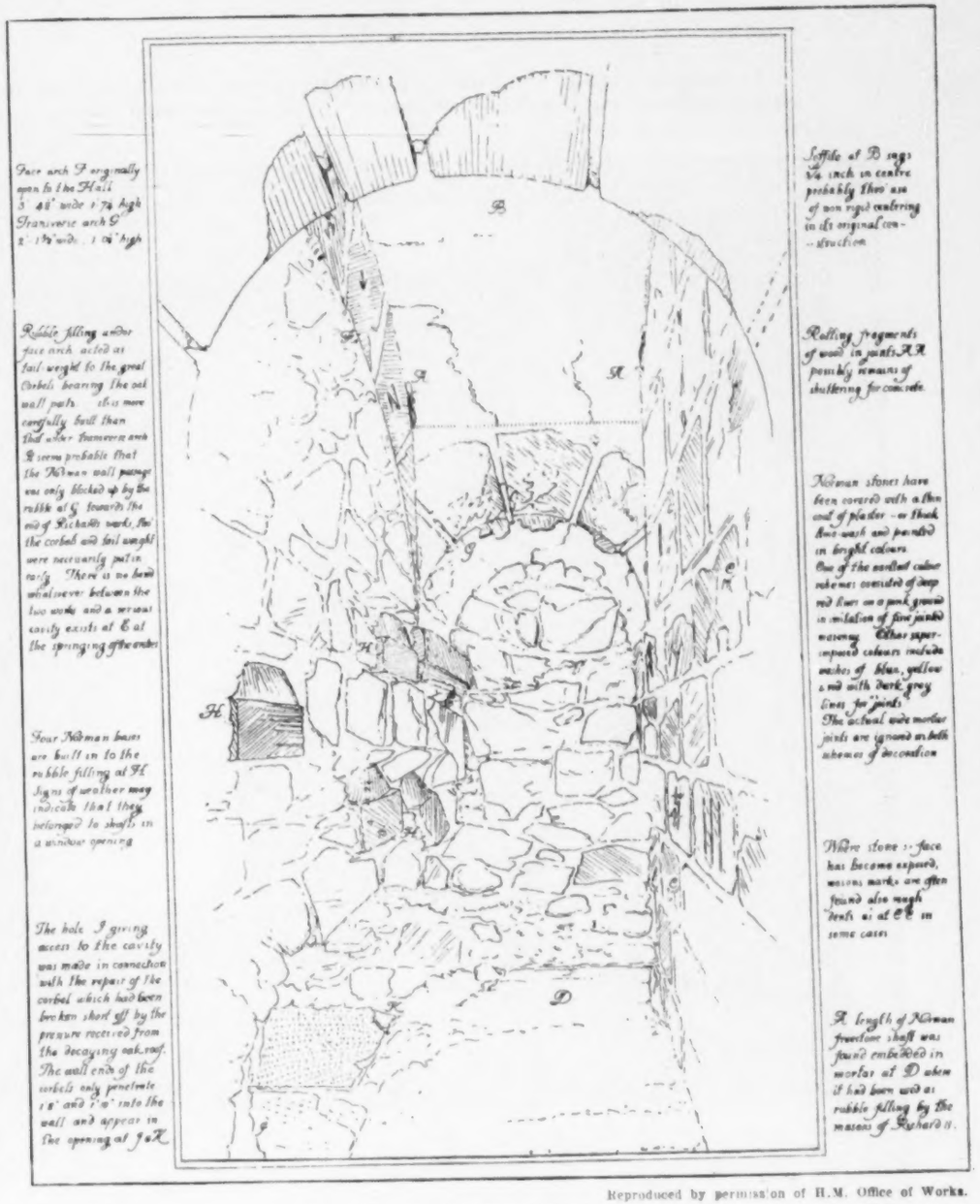
Face arch F originally open to the Hall 5'-48" wide x 7'-7½ high Transverse arch G 2'-1½" wide x 1'-0" high
Rubble filling under face arch acted as tail weight to the great Corbels bearing the cat wall parts. This more carefully built than that other transverse arch
It seems probable that the Norman wall passage was only blocked up by the rubble at G towards the end of Richard's work, for the corbels and tail weight were necessarily put in early. There is no bond whatever between the two works and a vertical cavity exists at C at the springing of the arches
Four Norman bases are built in to the rubble filling at H. Signs of weather may indicate that they belonged to shafts in a window opening
The hole J giving access to the cavity was made in connection with the repair of the corbel which had been broken short off by the pressure received from the decaying oak roof. The wall ends of the corbels only penetrate 18" and 9" into the wall and appear in the opening at J & K
Soffits of D rags 4½ inch in centre probably there are of non rigid cantering in its original construction
Rolling fragments of wood in joints A A possibly remains of shuttering for concrete
Norman stones have been covered with a thin coat of plaster — or thick lime wash and painted in bright colours. One of the earliest colour schemes consisted of deep red lines on a pink ground in imitation of fine jointed masonry. Other superimposed colours include washes of blue, yellow and with dark grey lines for joints. The actual wide mortar joints are ignored on both schemes of decoration
Where stone in face has become exposed, masons marks are often found also rough tooth at at C C in some cases
A length of Norman transom shaft was found embedded in mortar at D when it had been used as rubble filling by the masons of Richard II.
A
B
C
D
E
F
G
H
J
K

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FIG. 14.—VIEW LOOKING NORTH IN NORMAN WALL PASSAGE AT PRINCIPAL NO. 5 EAST.

WESTMINSTER HALL NORMAN ARCADE.

WESTMINSTER HALL NORMAN ARCADE.

BY WILLIAM HARVEY.

WHEN the great arched hammer-beam roof of Westminster Hall was found to be seriously decayed by the excavations of the Death Watch beetle new steel trusses were designed as part of the works of repair undertaken by the Historic Buildings Branch of H.M. Office of Works. These trusses, which were made subservient to the old timbers, and are unobtrusive and practically invisible from the floor of the Hall, were necessarily heavy constructions, and their seating on the tops of the long side walls of the Hall was made the subject of careful consideration, involving a survey of the condition of the walls and calculation of their stability. The exterior and interior sides of the walls had been faced and refaced with ashlar masonry from time to time, and their strength was first calculated upon the assumption that the interior was composed of chalk and lime concrete of fair quality contained within comparatively sound skins of wrought masonry, as had been the case in the first place examined.

Further investigations, as the work proceeded, revealed certain weaknesses, and a more searching examination became necessary. The design of the new steel work is affected by the desirability of following the line of the old timbers, and the truss is of a very high scissor type, with the feet of the principal rafters acting on the extreme inside edges of the wall tops. The question arose as to whether the wall could stand any eccentric pressure at this point, and carefully taken measurements showed that the masonry lining of the walls, inserted in 1834 by Sir Robert and Sidney Smirke, was composed of thin slabs on edge anchored back to the rubble core with iron cramps at intervals. This ashlar did not even present a plain vertical surface. It became evident that the internal facings could not be trusted to bear any weight, and a special grillage was devised to spread the pressure of the roof with a cantilevered bed-plate anchored deeply into the wall top. During the investigation of the wall behind the principal it was proposed to repair first, a few Norman facing stones and a piece of string course were discovered behind the old wall post (Figs. 4, 5, 8, and 11*). The examination was conducted by means of electric lamps hung in the cramped space between the wall post and the wall, and, some irregularities of the wall's surface proving inaccessible, a length of oak plank was removed from the side of the wall post, revealing a few voussoirs of a Norman arch packed up on a filling of mixed ashlar and rubble under-pinning (Fig. 4). The fragments were measured with as much accuracy as the restricted space would permit, and sketches were made of the appearance of the work, while it remained exposed to view.

Facilities for archæological research were extremely limited owing to the demand for men in the Army or for the design of war factories. No funds were available for investigations not strictly connected with the stability of the structure, and the staff engaged on the collection of evidence was given clearly to understand that, while archæological data were to be collected where finds were made, no stones or timbers were to be removed unless their removal could be justified by purely practical considerations connected with the possible alteration in the condition of loading due to the new steelwork. The good sense of this war-time regulation was faithfully kept, and the position of each trial hole for ascertaining the strength of the wall was made the subject of a guess before the mason was called upon.

These preliminary conjectures were directed by three considerations—(1) Sidney Smirke's account of Norman fragments discovered when the walls were lined with Huddleston stone; (2) Professor Lethaby's conjectural restoration in "Archæologia," vol. 60; and (3) by the assumption that the proportions of the first Norman fragment found were based on a system involving the repetition of a standard unit, the unit being the width of the pier at the springing of the fragment of arch first found (Figs. 8 and 11).

Early Norman work is notoriously irregular, and the third assumption was put forward as a working hypothesis for want of a better, with the proviso that a variation of a hand's breadth either way would be accepted as regular. Compared with the actual fragment found Smirke's records proved to be untrustworthy. He was evidently possessed of an idea that Norman work was, above all things, massive, and consistently underestimated the size of arches throughout his drawing. Professor Lethaby came wonderfully near an exact statement, but his drawing shows a small pier of plain masonry between the pairs of columns bearing the springers of the lower arches of the arcade.

This plain masonry would have imparted a reasonable degree of solidity to the upper part of the wall, but the measurements of the first fragment indicated that the design of the early builders, while very beautiful, was almost unreasonably slight in its construction. The third consideration was allowed to outweigh the other two, and the mason was instructed to remove a slab of the smooth internal wall lining at a point calculated on the supposition that the Norman arcade was set out on a basis of orderly repetition. Remains of a cluster of four cylindrical shafts were discovered with evidence for the position of the springing of the central pair of small arches of the arcade. A point far down the Hall was next attacked and revealed a springer block in position, though with its face hacked off, at the calculated distance from the first fragment.

Traces of the Norman work were next discovered on the opposite wall of the Hall, the details being slightly larger on the west than on the east side. Another departure from regularity was found in the position of corresponding portions of the arcade which do not stand opposite each other on lines at right angles to the axis of the Hall, but on lines crossing it obliquely. The Norman buttresses which remain on the outsides of the walls confirm this eccentricity of spacing. Investigation of the Norman fragments might have been stopped at this point if it had not been for the accidental fracture of the great stone corbel supporting the eastern wall post of the fifth truss from the north end of the Hall. Between the time of the first examination and the time when the truss could be taken in hand for repair movements in the timbers subjected this corbel to such excessive pressure as to break it off short at the face of the wall. The detached fragment was held, however, by the oblique thrust of the timber pressing it into the wall, and measures were put in hand for its repair. The wall post was supported temporarily from the steel staging

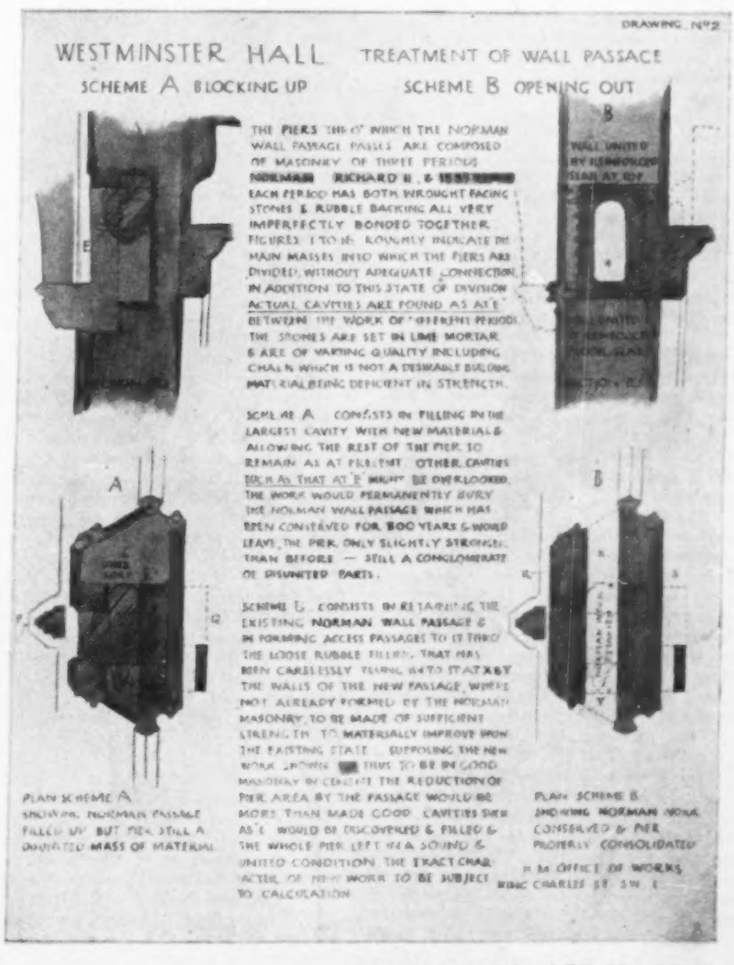
DRAWING N°2
WESTMINSTER HALL TREATMENT OF WALL PASSAGE
SCHEME A BLOCKING UP
SCHEME B OPENING OUT
THE PIERS ON OF WHICH THE NORMAN WALL PASSAGE PASSES ARE COMPOSED OF MASONRY OF THREE PERIODS NORMAN RICHARD II & 1834
EACH PERIOD HAS BOTH WROUGHT FACING STONES & RUBBLE BACKING ALL VERY IMPERFECTLY BONDED TOGETHER.
FIGURES 1 TO 10 ROUGHLY INDICATE THE MAIN MASSES INTO WHICH THE PIERS ARE DIVIDED, WITHOUT ADEQUATE CONNECTION.
IN ADDITION TO THIS STATE OF DIVISION ACTUAL CAVITIES ARE FOUND AS AT E BETWEEN THE WORK OF DIFFERENT PERIODS.
THE STONES ARE SET IN LIME MORTAR & ARE OF VARYING QUALITY INCLUDING CHALK WHICH IS NOT A DESIRABLE BUILDING MATERIAL BEING DEFICIENT IN STRENGTH.
SCHEME A CONSISTS IN FILLING IN THE LARGEST CAVITY WITH NEW MATERIAL & ALLOWING THE REST OF THE PIER TO REMAIN AS AT PRESENT. OTHER CAVITIES SUCH AS THAT AT E MIGHT BE OVERLOOKED.
THE WORK WOULD PERMANENTLY ENTRY THE NORMAN WALL PASSAGE WHICH HAS BEEN CONSERVED FOR 800 YEARS & WOULD LEAVE THE PIER ONLY SLIGHTLY STRONGER THAN BEFORE — STILL A CONGLOMERATE OF DISUNITED PARTS.
SCHEME B CONSISTS IN RETAINING THE EXISTING NORMAN WALL PASSAGE & IN FORMING ACCESS PASSAGES TO IT THRO' THE LOOSE RUBBLE FILLING THAT HAS BEEN CARELESSLY PUT IN AT X & Y BY THE WALLS OF THE NEW PASSAGE WHERE NOT ALREADY FORMED BY THE NORMAN MASONRY, TO BE MADE OF SUFFICIENT STRENGTH TO MATERIALLY IMPROVE UPON THE EXISTING STATE. SUPPOSING THE NEW WORK SHOWN THUS TO BE IN GOOD MASONRY IN CEMENT THE REDUCTION OF PIER AREA BY THE PASSAGE WOULD BE MORE THAN MADE GOOD. CAVITIES SUCH AS E WOULD BE DISCOVERED & FILLED & THE WHOLE PIER LEFT IN A SOUND & UNITED CONDITION. THE EXACT CHARACTER OF NEW WORK TO BE SUBJECT TO CALCULATION.
PLAN SCHEME A SHOWING NORMAN PASSAGE FILLED UP BUT PIER STILL A DISUNITED MASS OF MATERIAL
PLAN SCHEME B SHOWING NORMAN WORK CONSERVED & PIER PROPERLY CONSOLIDATED
H.M. OFFICE OF WORKS KING CHARLES ST. S.W. 1

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FIG. 10.—DRAWING PREPARED FOR CONSIDERATION OF MEANS OF STRENGTHENING THE WALL.

* Figs. 1 to 9 are in our inset illustrations.

which had been erected on the floor of the Hall, and holes were bored into the wall just above the corbel to serve for the insertion of a new cantilever bearing for the foot of the wall post. When the mason's crowbar had penetrated some two feet into the wall the resistance to its progress ceased and it became evident that a large cavity existed in the heart of the wall. As the stability of the wall was seriously affected the examination was proceeded with and the hole enlarged until a lamp could be inserted through the opening. A back wall was easily seen, but the extent of the cavity upwards and on either side could not at first be determined. Taking all precautions against a fall in the structure, Sir Frank Baines ordered the hole to be enlarged until access was obtained for a person to crawl into the interior, when detailed measurements were taken of the size of the cavity both in its relation to structural stability and the history of the Norman work (Fig. 14).

It was at once realised that a serious problem had arisen, since if one pier was hollow, what would be the effect if all the other piers were also hollow? The complete examination of the wall was therefore put in hand, and though it was not proposed to strip the wall facing wholesale, trial holes were made at points where cavities might be expected. The positions for these were worked out as before, each new find confirming the correctness of the previous suppositions until it was possible to reconstruct on a drawing the outlines of the old Norman design with the assurance of accuracy in all the most important points (Fig. 1). The cavities in the wall were found to have formed part of a continuous gallery or passage whose floor was approximately mid-way up the height of the wall. The arcade formed its front facing into the Hall, while its back was formed by a wall of Norman masonry pierced at intervals with large, round-headed windows. The details actually found included columns, capitals, bases, abacus or springer blocks, fragments of large rear arches over the windows, and in some cases complete small arches of the arcade facing on to the blank wall between one window and the next. The plan and elevations were drawn to scale in the Hall and show the complete design as far as it affects the side walls. The character of the detail is simple and early as would be expected in a structure of the time of William Rufus, the Hall having been built originally as a palace for that king.

The capitals (Figs. 2 and 9) are of simple cushion type with flat surfaces interpenetrated by a right cone with interesting hyperbolic arrises. The springer block above each group of four capitals was provided with a bold cyma reversa moulding (Figs. 2, 5 and 11), and is a large slab serving to steady and unify the separate capitals below. The shafts are composed of drums of freestone of irregular lengths and are entirely separate one from another. They are jointed in fat lime mortar, sometimes with excessively wide joints, and do not seem to promise any great degree of stability; the wide irregular joints apply throughout the Norman work and vary from ½ in. to something like 2 in. in dimension. As in Byzantine times, the mortar was looked upon as an important material of construction, and where some of the masonry itself is composed of chalk the theory that the mortar is as good as stone may be held to justify itself; it is certainly used in this manner in the Norman arcade. The stones seem to have been cut to standard patterns, and where any deviation was required in execution a little more or less mortar permitted of the necessary adjustment.

This is particularly noticeable in some of the smaller arches of the arcade, where the lower edges of the voussoirs are found to be almost in contact at the soffit but widely separated by thick mortar beds at the extrados. The use of mortar as a substitute for stone is carried to extraordinary lengths at the springing of those small arches of the arcade which adjoin the bases of the angle shafts at the return of the large window arches. Here the springing "stone" of the upper order of voussoirs is formed entirely of mortar (Figs. 3 and 8). In view of the disconnected character of the four shafts composing the pier, the risks taken in this fragmentary style of building are surprising. They are justified, however, by their practical success, and in theory by the supposition that mortar is as good as stone. An even more extraordinary example of trust in mortar is presented at the intersection of the face arch with that returning across the passage: the voussoirs of the face arch are of normal shape, but the lower voussoir of the return arch is merely a fragment resting against it; the joints, well smothered in mortar, have proved sufficient to keep all snug. The plastic nature of this kind of building is exemplified in the sagging soffits of vault and arch, and in the roughly elliptical contour of the arches.

Several small indications exist which go to show that the arches were built upon more or less primitive centres, and that alterations in curvature took place immediately the voussoirs were placed in position (Fig. 3). The stones lip over one another, in some cases, as if the lower voussoirs had been allowed to feel a lateral thrust while the work was still green. An interesting sidelight on Norman methods of centering was provided in the interior of the cavity at the broken corbel.

The wall passage is roofed with small barrel vaults following the curve of the extrados of the small arches of the arcade (Fig. 14). These vaults inscribe curved lines upon the rear wall of the gallery, where the ashlar has been built up to form a sort of round topped gable. Between the gable and the vaulted soffit, and between the soffit and the extrados of the voussoirs, joints were found partly smeared over with the skim coat of plaster, but open in one or two places where a dark brown substance appeared instead of the usual fat lime mortar. The substance proved to be the remains of the broken off ends of thin oak laths which had been considered sufficient centering for the little vault, and which had been roughly hacked out when the lime concrete had set and their ends left in the joint. The sagging line of the soffit shows how the laths had bent under their load of green material.

The irregular widths of mortar joints did not distress the builders or the users of the building, for all minor irregularities were hidden beneath a thin coat of plaster and colour wash. On almost every fragment of Norman work traces of colour were found either adhering to the stone or to the plaster surface. In the case of wrought masonry of columns, capitals, and the moulded springer blocks the colour was generally applied in a coat such as might have been put on with a brush. Less important work shows signs of having been dinged in some places to roughen it for a coat of plaster, similar to that applied to the under surfaces of the arches and vaults, composed of rubble concrete.

The traces of colour were noted with great care, but it was impossible to determine exactly what colours were used in conjunction with one another at any one period. Repeated indications of dark red lines on a pink ground suggest that this was one of the first schemes of decoration applied to the masonry. Succeeding coats included yellow, blue and white with dark grey lines instead of red. In no case do the painted joint lines coincide with the actual jointing of the masonry; the lines of paint, too, are much more nearly uniform than the irregular joints of lime (Figs. 2, 5, 8 and 14).

At some time the springer blocks were painted dark red and the shafts and capitals blue, but it cannot be stated definitely that these colours were contemporaneous with the pink background, though this may, quite possibly, have been the case. Some of the last coats include faded rosettes on a white ground, and are evidently much later than the masonry upon which they are painted, many coats intervening between the rosette decoration and the early coat of pink. Wherever the masonry surfaces have been denuded of their colouring and plaster the stones are found inscribed with mason's marks, and wherever these were visible they have been faithfully copied on the drawings, which were all drawn and coloured in the Hall itself. The diagonal tooling of the individual stones is also indicated on the drawings in imitation of its position in the actual work. Notes on the drawings were inserted on the spot and must be read in the light thrown by the collection as a whole. Those on the early drawings sometimes include expressions of opinion, as to proportions, etc., which were interesting in connection with the limited facilities for examination, but for which there was at that time no certain ground for assurance.

The unexpected find of cavities in the walls and the much more thorough investigation which followed, converted several of these tentative suggestions into established facts, and the assumption that the design of the wall arcade would be found regular within a hand's breadth was proved to be correct for every bay except those at the ends of the Hall, where changes were introduced in the design to meet certain requirements whose nature has not yet been made clear. Access to stair turrets or minor chambers may be suspected as the reason for the alterations. The uniformity of the size of the piers and the bays in the Norman arcade made it seem probable that the width of pier was used as a unit throughout the design, and on the plan (Fig. 1) the average unit is marked by way of scale alongside the diagrams showing the position of the Norman fragments. It is not claimed for this width that it indicates any standard measure in use among the Normans; in fact, it differs slightly on the opposite sides of the Hall, but the builders evidently found it convenient to make the small arches about twice as wide as the pier and the large arches four times as wide, and use other significant numbers rather than ambiguous irregular fractions, since photo-copying had not been invented to put the knowledge of a complicated pattern within the reach of all the workmen. Anyone who takes the trouble to draw out a bay of the design, using the squares as a basis, would find it difficult to forget the main proportions, and would only go wrong by the hand's breadth, which the Normans seem to have allowed themselves.

The Norman walls must have been considerably heavier on their outer than on their inner sides, where they were lightened by the wall passage and arcade (Figs. 1 and 12). As might be expected, they were found to be leaning outwards when Richard II's masons inserted the corbels for the new roof. This inclination of the side walls involved a widening of the Hall at its central part and at Richard's restoration presented a problem which was overcome by dubbing out in the centre of the Hall and hacking out portions of the wall's face at the ends. Richard II's masonry facings were sacrificed when Sir Robert Smirke re-faced the interior, and only the Perpendicular cornice, the corbels and the window mouldings and tracery have remained visible in the Hall.

In the cavities left in the wall the work of Richard's masons was found just as they had executed it. The first of his new works to be executed were the new corbels, and points were chosen for their insertion below the small arches of the arcade, where they would interfere as little as might be with the support of the superincumbent weight (Fig. 1). The oblique spacing of the old arcade on the two opposite sides of the Hall prevented this economical plan being carried out in all cases, and one shaft or another had to be removed to allow of the corbels tailing into the wall at points reason-

ably in correspondence with one another according to fourteenth century notions of exactness, which, while not so rigid as those of the present day, were considerably in advance of the ideas of the Normans where external appearances were concerned.

The way of access around the Hall by means of the Norman wall passage seems to have been maintained until late in the work of Richard II's restoration, and the tail-weight to the corbels was provided by building a wall some 2 ft. in thickness upon the back of the corbel up to the soffit of the Norman arch, or, in the case of corbels standing where Norman clustered shafts had stood, up to the underside of the abacus or springer block. Any material that came to hand was used for building these portions of the wall, and fragments of the old work were sometimes found; notably some weatherworn Norman base stones for columns, possibly from the exterior jambs of the Norman windows of the Hall (Fig. 14).

Towards the end of Richard's amendments new windows were cut in the walls of the Hall approximately in the middle of each bay between his new oak trusses. The positions of the new and the old windows did not coincide, and one old window jamb was added to and the other jamb cut away. This happy-go-lucky procedure, while it is calculated to make a modern engineer's hair stand on end with horror, had the merit of conserving for us whatever evidence remains of the great arches returning into the window jambs (Fig. 1).

Where the filling in of the jambs of Richard II's new windows abutted upon the void of the Norman passageway a heap of loose rubble was first thrown in, and was found lying in some of the cavities just as it had fallen. The work was practically devoid of mortar in some places, and the most appalling risks were run in consequence of the lack of cohesion of the several masses of which the

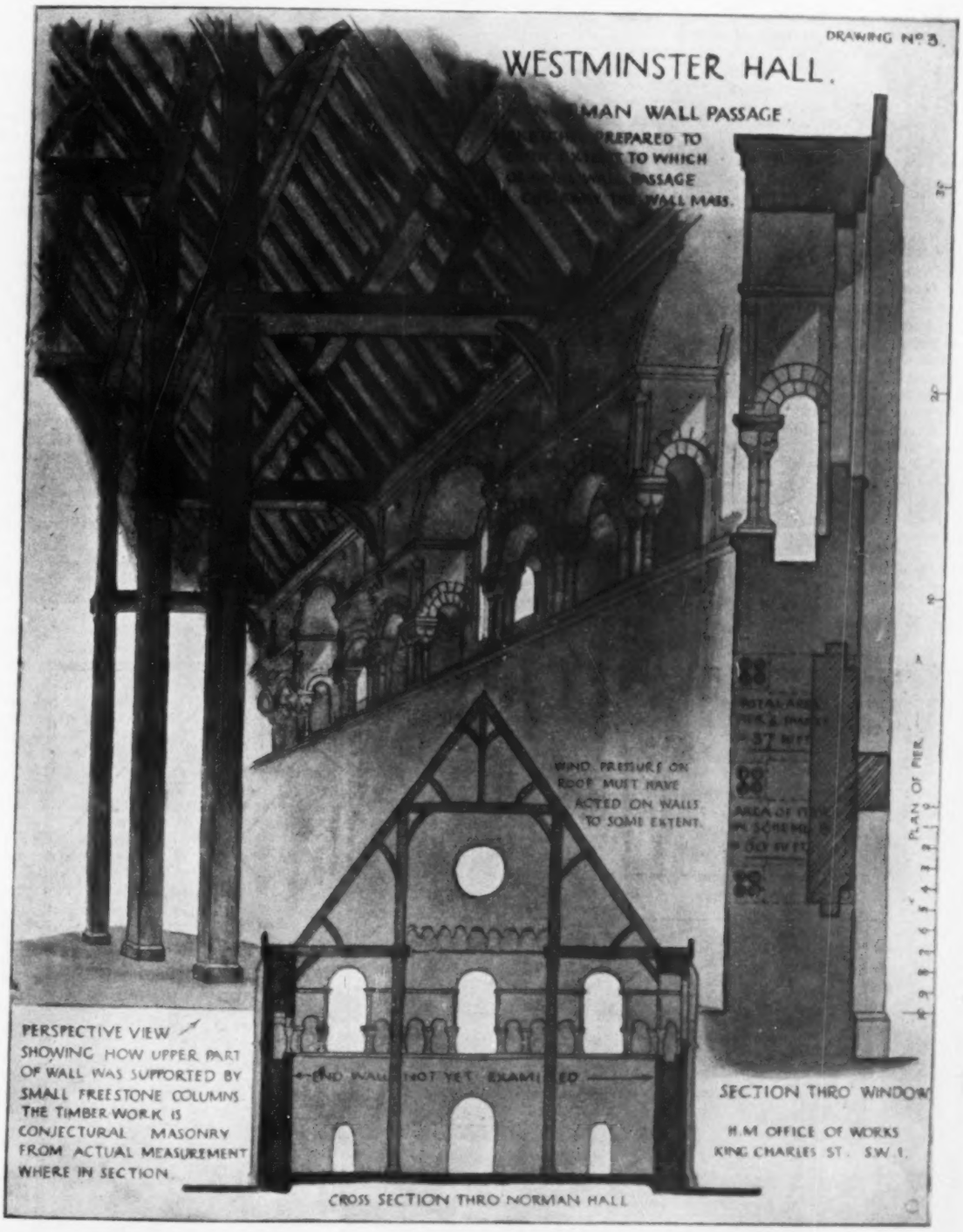
DRAWING No 3.
WESTMINSTER HALL.
MAN WALL PASSAGE.
PREPARED TO
TO WHICH
PASSAGE
WALL MASS.
WIND PRESSURE ON ROOF MUST HAVE ACTED ON WALLS TO SOME EXTENT.
PERSPECTIVE VIEW SHOWING HOW UPPER PART OF WALL WAS SUPPORTED BY SMALL FREESTONE COLUMNS THE TIMBER WORK IS CONJECTURAL MASONRY FROM ACTUAL MEASUREMENT WHERE IN SECTION
END WALL NOT YET EXAMINED
CROSS SECTION THRO NORMAN HALL
PLAN OF PIER.
SECTION THRO WINDOW
H.M OFFICE OF WORKS
KING CHARLES ST. S.W.1.

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FIG. 12.—EARLY ATTEMPT TO COMPILE A RESTORATION. FURTHER INVESTIGATIONS SHOWED THAT THE PILASTER STRIPS AND CORBELS HAD NO EXISTENCE, THE STRING COURSE RUNNING THROUGH WITHOUT A BREAK.

wall was composed. Even the underpinning, which served to provide tail weight to the corbels, was sometimes executed in a very flimsy manner, with cavities between it and the work it was supposed to press against (Fig. 14).

Taking into consideration that the piers between windows were not only weakened by the cavities but also by the indifferent nature of the core and the several different unbonded portions composing the mass of masonry, it was found advisable to fill in the cavities with new material after drawings, showing the remaining fragments of Norman work, had been prepared. This decision was not come to without a searching inquiry, and the alternative suggestion was put forward for making the cavities accessible by means of small tunnels entering the piers from the adjoining window-sills (Fig. 10). This course, while admittedly possible, was found to be too hazardous and too costly to be put into practice. The Ancient Monuments Board of England and Wales were consulted on the matter, and gave their opinion that so long as records were preserved the cavities should be filled in.

To preserve some vestiges of the Norman arcade in an accessible state several trap-doors were made through the slab facing stones to permit of inspection by means of ladders placed in the Hall. The larger doors were cased in steel frames, and were mounted on gunmetal pivots, so that the hinges are not likely to rust and stick fast.

In connection with the line of the internal facings a strange discovery was made, which indicates that a change of plan took place between the beginning and the end of Richard II's alterations. A cornice 2 ft. in height was added to the Norman wall at the same time as the corbels were inserted half-way up its surface. Of this cornice only the uppermost 9 in. is now visible; the lower portions are covered up by the slab facings applied by Smirke, who declares in his account that he re-faced the walls where Richard II had done so before him, mentioning several interesting fragments of carved stone, etc., which he discovered during the demolition. The position of the mouldings of the rear arches of the Perpendicular windows confirms Smirke's statement, and it seems that at the outset it was proposed to utilise the old Norman face of the wall, the new cornice having been set in relation to it, and later, when its irregularities became apparent, a facing of stone was added. The effect of the cornice had to be sacrificed to an appearance of neatness, for the new facing was too thin to be more than a cloak hung on to the wall by dowels and metal cramps.

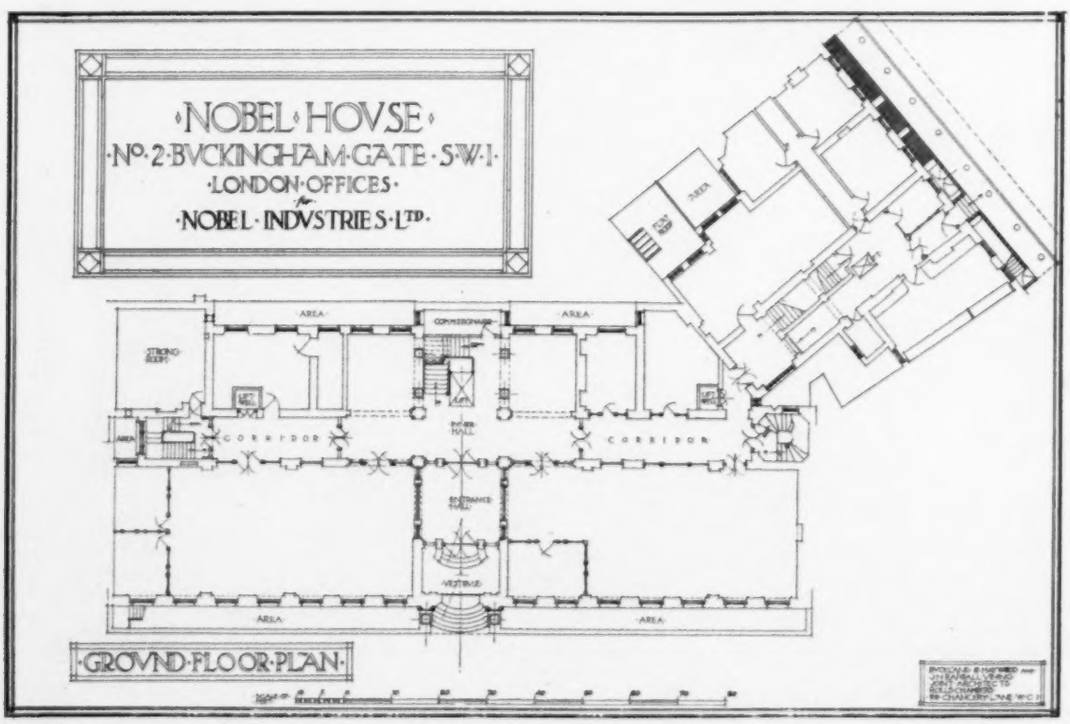
It has been mentioned already that the oblique spacing of the remaining buttresses on the east and west walls of the Hall agrees with other details of the wall arcade, and this raises the question of the arrangement of the Norman roof beams at their junction with the wall tops. The great size of the Hall would demand that large and conspicuous timbers should be used, and it is generally accepted that two parallel rows of posts were introduced to divide the space into three manageable spans somewhat on the lines of the nave and aisles of a church (Fig. 12). It seems impossible that these posts could have been arranged otherwise than upon lines joining the centre lines of the piers between the windows, but a glance at the plan (Fig. 1) shows how this would have been a decided departure from the rectangular. It may be said in extenuation of the Norman builders that the magnitude of the Hall and the flatness of the lower and the upper part of the side walls, both below and above the wall arcade, would go far towards disguising the oblique lines of their setting out, though the knowledge of its lack of balance may have contributed to form Richard II's resolve to sweep away the old work and re-roof the Hall without any intermediate supports whatever.

Cottages at St. Brieuc, Brittany.

From a Sketch by LIEUT.-COLONEL H. P. CART DE LAFONTAINE, A.R.I.B.A. (*See p.* 10.)

Victoria and Albert Museum.

H.R.H. the Prince of Wales has lent to the Victoria and Albert Museum a very interesting example of the groups of models formerly arranged in Japanese houses on the occasion of the "Boys' Festival" (*Tango*) on the 5th day of the 5th month in each year. The group has been placed in the West Hall of the Museum, near those lent by H.R.H. Princess Mary, which relate to the "Girls' Festival" celebrated on the 3rd day of the 3rd month. The Prince has also lent some examples of modern Japanese lacquer and of reproductions of ancient historical caskets, which are exhibited in the Loan Court.



MESSRS. BUCKLAND & HAYWOOD, FF.R.I.B.A., and MR. J. N. RANDALL VINING, F.R.I.B.A., Joint Architects. (*See p.* 15.)

THE BEAUTY OF ITALIAN RENAISSANCE.

BY PROFESSOR ALFREDO MELANI.

Venice, the City of Water, Silence, and Colour.

OF all Italian cities Venice is perhaps the best-loved by English people, who have always delighted to visit this "city of marble, nay, rather a golden city, paved with emeralds . . . with rippled music of majestic change or thrilling silence" (as Ruskin calls it in "Modern Painters"), enriched by the warm Byzantine colouring of Giorgione's, Titian's, and Tintoretto's paintings, and the quieter tones of Carpaccio, Giambellino, and Cima. Venice is a hymn to colour, a miniature world of spiritual and mental enjoyment, where all mean thoughts are banished and nothing but contempt can be felt for our poor modern life. The city of colour! This thought is not confined to painting, it covers all the arts, including architecture and sculpture, for the Venetians coloured and gilded everything.

Those who visit Venice to-day do not get the same impression as they would have done in the fifteenth and sixteenth centuries. At that time the buildings and monuments—those grand sepulchral monuments which are so notable a feature of Venice—were all coloured and gilded, blue and gold being largely used. Even now, on approaching the famous monument in SS. Giovanni e Paolo to Doge Andrea Vendramin-Calergi (late fifteenth century) the blue and gold particles that have defied time reveal the original aspect of the monument and dazzle those unable to rid themselves of the present-day aversion to coloured marbles. To-day the marble of Carrara and the stone (from no matter what quarry) used for mouldings and other decorative purposes are left uncoloured for the sun to warm and brighten, the painter's brush being considered superfluous, even harmful. This is a new and almost strange doctrine to persons of culture, but nevertheless in Italy a famous Venetian politician had what remained of the blue and gold work executed by the Dalle Masegne in S. Francesco of Bologna scraped away and removed, alleging it to be a vulgar addition of the Secento (!).

Venice has also a local colour, derived not from the blue or gold with which the artists covered their stones and marbles but from the water and the ambient air, the palette being sometimes rich, sometimes delicate, but always fascinating, always unique, always mysterious. Little by little the added colour is disappearing, its richness becoming dimmed. The good spirits now dream regretfully of Venice and her colour, though there is still S. Marco and the Piazza, where the Golden Basilica reigns supreme, a Muse as unattainable as that of the great poets. And Venice has yet one of her greatest charms—her silence—more noticeable than ever to-day when one's ears are filled with the din of great towns. Tramways, motor-cars, motor-cycles, and street-hawkers' cries are confined in Venice to the *calli* (streets) or the *campi* (squares) in the interior of the city, far removed from the canals on which glide the gondolas and distant also from the Grand Canal, where only the little steamboats disturb slightly the mysterious quietude.

Style and Local Characteristics.

Venice is a city of radiant architecture, but when speaking of Renaissance we have to distinguish between the various styles and periods included in that term; for instance, the fifteenth-century Vendramin-Calergi Palace on the Grand Canal is quite different from the Palazzo Corner, and the Ca' Grande from the cinquecento Grimani and Pesaro palaces. They represent two distinct styles and aspects, and consequently two different epochs in the golden era of Renaissance—the fifteenth and sixteenth centuries. Conditions in Venice were excellent, trade was flourishing, projects were ambitious, and the means existed for putting them into execution, no matter how elaborate they might be, whilst culture and the love of beauty afforded a lively and constant stimulus.

Imagine Venice and the Grand Canal without the Renaissance palaces and the Rialto Bridge (built rather late), without the Vendramin-Calergi Palace, the Palazzo Corner-Spinelli, the Pisani, Grimani, Montecuccoli, Dario, and Contarini Palaces, the Piazza S. Marco without the Procuratie, Old and New, without the Clock Tower, and Venice without the Church of S. Zaccaria, without S. Giorgio degli Schiavoni, without S. Maria dei Miracoli, the Scuole di S. Marco and S. Rocco! We should still have the Golden Basilica, the Ducal Palace, the Ca' d' Oro, the Palazzo Foscari, SS. Giovanni e Paolo, the Frari, S. Stefano, but Venice, confined to her Byzantine and Gothic dress is no longer the resplendent city that every poet longs to visit, the haven of peace for all dreamers. It is not my wish to disparage the beauties of Venice prior to the fifteenth and sixteenth centuries, but to restore Renaissance work to its proper place—the City of the Lagoon offering a varied picture of all epochs and all styles, free from any trace of monotony.

It is noticeable, however, that the fifteenth-century stones and marbles of early Venetian Renaissance (the time of the Primitives), preceded by Florentine Renaissance on lines corresponding to the following period—the period of Bramante in Rome—are not without a certain Oriental touch, due to the ties linking Gothic with Renaissance and both with Byzantine. This Eastern influence on Venetian stones and marbles is shown by a certain exuberance, a certain gay splendour, a certain grace, that recall the best features of the Moorish style, the studied elegance and refinement of Mussulman construction. Grace, both of design and colouring, is found in church and palace alike. Rising out of the water on artificial foundations and supported by palisades, architecture was necessarily graceful and light, the limited area accorded by the sea likewise imposing restrictions. Elsewhere, this cause has had a different effect. In Genoa the "Proud," where the sea forms an obstacle to building and space is not unlimited as in Rome, Florence, or Siena, the palaces rise to vertiginous heights and have the aspect of giants. The few examples of this kind in Venice are exceptions; they include the Gothic churches of the Frari and SS. Giovanni e Paolo, whose spacious naves and towering columns create an imposing antithesis, but these churches are in the *campi*, away from the canals, thus making possible a modification in the local programme.

Early Renaissance, on the other hand, displays a delicate and radiant beauty: capitals, bases, corbels, balusters, cornices, and entablatures all being well carved, whilst a wealth of various coloured marble discs decorates the sober, elegant, and grace-inspired façades. The carvings resemble the old Byzantine and Gothic *motifs* in the way the foliage is undercut and curved, and the little discs are quite a charming Venetian characteristic, arranged crosswise in the bays, as on the exterior of S. Maria dei Miracoli, that jewel of Venetian

Photo: Ed. Alinari.

Chiesa dei Miracoli, Venice.

grace. They are grouped differently on the palaces, where they are small, round or rectangular in shape and framed by sculptures. Red, blue, and green in colour, they are disposed with harmonious unity and restraint. There is nothing similar in Rome, Florence, Siena, or Genoa.

You who go to Venice should compare her palaces with those of Rome, Florence, Siena, and Genoa, and you will notice the profound difference. In Venice voids dominate solids, this tendency being present even when Jacopo Sansovino, Michele Sammicheli, Andrea Palladio, and Vincenzo Scamozzi are the architects. Although their work is graver than all the early Renaissance palaces in Venice, it is not so stern as to form a strong contrast. I mean to say that all buildings in Venice are under the sway of her local laws—grace and an exquisite taste in small details being always present, no matter what the epoch or the occasion. An exception is difficult to find. For all these reasons Venetian Renaissance architecture occupies a unique position, and has a very marked artistic aspect, the school of her painters, from Carpaccio to Giambellino, Giorgione, Titian, Tintoretto, and Paul Veronese, being equally distinctive.

Columns! These are what give a special note to the architecture we are considering. Elsewhere, and at an earlier date, pilasters were ranged along the façades; now, for greater ornamentation, they are replaced by columns—double columns—the relief effect of which is much more striking than that of single columns, as, for instance, on the Palazzo Corner. The Vendramin-Calergi Palace, an example of the highest order, inhabited for a time by Richard Wagner, who died there, is probably the oldest Venetian palace with double columns. It consists of three stories, the ground floor, decorated with pilasters, being weak in comparison with the two above. Thus, the Vendramin-Calergi Palace presents what might be termed an extension of the process of inversion that has its model *per eccellenza* in the Ducal Palace, viz., weakness supporting strength—there, of course, only in appearance, but in the case of the Vendramin-Calergi Palace, in reality. Theoretically, the pilaster is superior to the column—it is stronger—but here, with its slight relief, it plays but a minor part, columns being tall and pilasters short.

There is no more eloquent example of a colonnaded façade in Venice than Sansovino's Palazzo Corner or Ca' Grande, where the two rows of double columns form a forest without interruption or variety, either in height or relief, over an extensive area, an arrangement which would be even more monotonous without the little balconies that appear at intervals. Fortunately, time has coloured the stone superbly, preventing this organic defect of excessive uniformity from standing out too clearly. In this case also local influence and tradition are apparent in the tall, narrow windows designed on Gothic lines. The façade is systematically divided into three: a group of windows in the centre signifies that a large hall is behind; then, symmetrically placed to right and left, appear one or two other windows. Such is the rhythmic arrangement of the palaces; it may sometimes vary, according to the architect, but only on those rare occasions when the style does not follow Venetian tradition faithfully. The Grimani façade is thus a case in point. The interior of the palaces, therefore, consists of a grand hall in the centre of each floor, with small rooms at the sides. This habitually simple programme dates back farther than Renaissance in Venice. The façades of Gothic palaces clearly develop the disposition indicated. The Ca' d'Oro, that Gothic gem of Venice, is based on the same lines, though it is less symmetrical as regards windows, the central group being accompanied by two others on one side only, but this does not prove that the Ca' d'Oro is incomplete. However, if we take instead the Palazzo Foscari we find the programme fully adhered to. It is noticeable that in Venetian palaces of the Renaissance, Gothic façades are readily transformed into Classic. It suffices to substitute

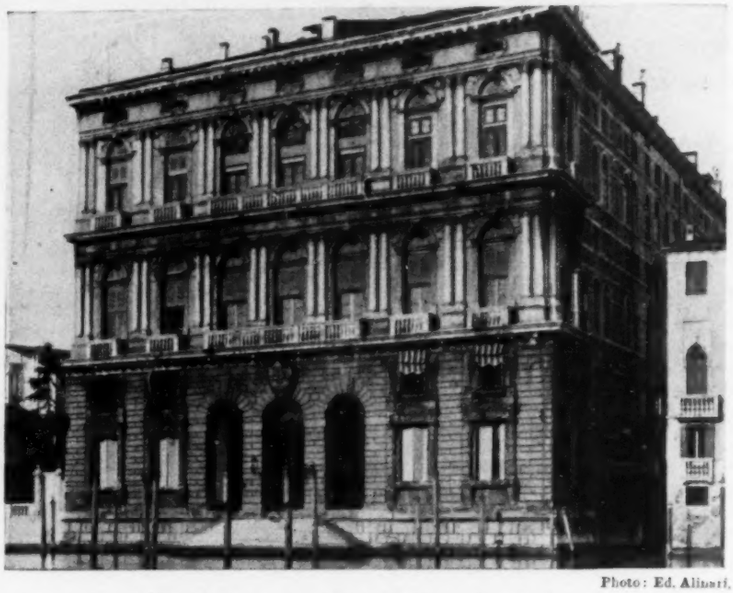


Photo: Ed. Alinari.

Palazzo Corner o della Ca' Grande, Venice.

details, such as windows and cornices. In many cases this substitution is confined to the two upper floors, which in Venice and Venetia become classic, while the rest of the façade remains Gothic. Contrasting lines then appear, but pass almost unperceived, thanks to the softening hand of time that has merged pointed and round arches into an harmonious whole.

Venice is accustomed to contrasts of this kind, the Doge's Palace, though Gothic, having columns instead of pilasters, while, as we have already seen, the Churches of SS. Giovanni e Paolo and the Frari likewise glorify columns. Similarly, another famous Gothic monument outside Venetia, the Cathedral of Orvieto, has columns supporting pointed arches, and a converse example is to be found in the famous Signoria Loggia in Florence, where Gothic pilasters carry round arches.

Among the characteristic features of Venice are the balconies to the windows. They may be either separate or continuous, and frequently project, thus affording scope for artistic corbelling, more usually found in Gothic than Renaissance. The reason for the addition of this feature is not hard to find; the palaces built on the Grand or other canals, with the beauty of the Lagoon, the splendid Venetian sky, the silent passage of the gondolas outside, plainly invited the architects to add balconies to the windows, whether grouped or separate, that adorned the façades, thereby giving the inhabitants an excellent means of enjoying their surroundings.

When passing along the Grand Canal the visitor is naturally prompted to ask whether in addition to the façades of these palaces, that form the noblest picture ever created by architecture, the old apartments, halls, &c., are not preserved also. The answer is disappointing. Generally speaking, nothing has been preserved; time, changed customs, the comforts of modern life, have all transformed and altered line and colour. Like some theatrical curtains, their promise and invitation only lead to a disillusionment passing all belief, the palaces that do not deserve this wholesale condemnation being but few. I mention a promise and an invitation, but must admit that even on the façades alterations are not infrequent, more especially in the case of the less famous palaces. In such instances one is even more anxious to inquire into their state of internal preservation, only to find that where the interior has not been completely spoiled it has been ruthlessly sacrificed to present-day requirements. I am not referring to furniture and other movables, but to mural decoration. Painters, stucco and woodworkers, all contributed to embellish the apartments, large and small, but save for a few rooms, like those in the Albrizzi and the Labia, paintings, stucco, carved and inlaid wood-work, have fallen miserably. In the Albrizzi and Labia palaces style succeeds style; Gothic and Renaissance are followed by Barocco, Rococo, and Empire; stucco-work and paintings are found therein (it is evident that we have now left the Grand Canal) to which the historian turns in order to compare the richness and geniality of Venetian art at varying epochs.

The frescoes of Giambattista Tiepolo are preserved in the grand hall of the Palazzo Labia. A few years ago alarming reports were spread as to the state of this hall, and in particular of Tiepolo's work, but were found to be exaggerated and no fear need now be felt. However, as the room is bare and devoid of furniture, it is cold, incomplete, and rather prison-like. That the Labia Hall should be visited as a museum is in many respects natural and for the best, seeing that the walls were decorated by Tiepolo and they are more liable to get damaged than ceilings nowadays. The one notable exception is the Ducal Palace, but this is a public building, a Gothic gem to which the greatest painters, stucco-workers, and carvers contributed. The Herculean paintings of Titian, Tintoretto, and Paul Veronese, whose exaltation is free from all traces of sentimentality, fill halls and apartments. In a similar way the Scuole or Confraternities, whether they have been converted to other uses or not, like the Scuola di S. Marco, which is now a hospital, and the Scuola di S. Rocco, still preserve more or less completely the beauties given them by the masters. At S. Rocco, Tintoretto is magnificent. The Scuola di S. Rocco (Renaissance architecture) is likewise visited as a museum, where honour is paid to architects, painters, sculptors, and carvers—Tintoretto, Titian, Campagna, and in a lesser degree, Brustolon.

Architects and Sculptors.

There is a ritualistic term by which Renaissance architecture in Venice and Venetia is designated, viz., "Lombardesque," an expression consecrated by historians. Thus, in Venice, or when speaking of Venice, stones and marbles that belong to the early, characteristic phase (preceding that personified by Sansovino, Sammicheli, Palladio, and Scamozzi) are termed Lombardesque. In no other region are these two great phases better illustrated than in Venetia, the former being early Lombardesque Renaissance, the latter late Renaissance. Everyone speaks of the Lombardesque style in Venice, and although the late Renaissance masters—Sansovino, Sammicheli, Palladio, and

Scamozzi—are venerated, the architects of the early Renaissance have won such sympathy that even if it does not imply any superiority it nevertheless savours of injustice, shown by the favouring of one group of artists and the disinheriting of a number of active and clever masters.

The Lombards! Was there an æsthetic alliance between Lombardy and Venetia in the fifteenth century? Undoubtedly. Venice received from Lombardy artists of every grade. The land that is now Swiss (Canton Ticino), the home of the "Maestri Comacini" in the Middle Ages, near Milan, with Bergamo on one side and Como on the other, sent her sons to the Queen of the Adriatic. Rich and powerful, eager to occupy a predominant artistic position, and her trade furnishing her with the means necessary to attain this end, Venice offered great attractions and allurements to artists. Thus, those who were nearest, the Lombards, with their superior workmanship, drew near to the "Enchantress," settling in the city and offering her their treasures of mind and hand. Lombard artists were held in high esteem. They were diligent, laborious workers, accustomed to expatriation; and Venice, like Rome, issued invitations to them all. When she wished to decorate the courtyard of the Ducal Palace with great splendour and to construct the famous Giants' Stairs, the architect, Antonio Rizzo, the most authoritative of the group of masters connected with the courtyard (late fifteenth-century), asked that he might have Lombard sculptors, whom he praised to the heads of the Republic, with the result that these workers assisted him in his noble task.

The term "Lombardesque" has, however, come to be identified with the Solari family, originally of Carona (now in Swiss territory, on Lake Lugano), and generally known by the name Lombardi. This family certainly worked in Venice at the time, but it is not right that all early Renaissance work should be ascribed indirectly to them. Although the Lombardi, Martino, Moro, Pietro—this latter with his sons Tullio and Antonio—had a hand in many buildings, those erected by artists unconnected with the Solari are not inconsiderable. Starting with Antonio Rizzo, a Veronese, who was an eminent architect and sculptor in Venice, the author of the two statues, Adam and Eve, in the courtyard of the Ducal Palace, fit to rank with the most beautiful marbles of the fifteenth century, there is a whole series of artists not belonging to the Solari who built and decorated in the so-called Lombardesque manner.

The founder of the Solari house (whose descendants still live at Carona) was one "Ser Martino de Charona." An excellent early Renaissance architect of Venice was Bartolomeo Buon, a native of Bergamo and one of a large family that enriched Venice in every branch of art (the celebrated painter, Palma il Vecchio, was born at Serinalta, near Bergamo). In 1517 Buon designed the Scuola di S. Rocco; at an earlier date (1496) and in conjunction with Mauro Coducci (known as Moro), another Bergamasco, he built the Clock Tower, an elegant construction in St. Mark's Square. Mauro Coducci completed the Scuola di S. Marco (begun by Pietro Lombardo in 1488) after its destruction by fire in 1485. A contemporary artist of lesser note is Giovanni Buora of Osteno (Lake Lugano, died 1517) who, with Anton Marco Cambello, erected the sprightly façade of S. Zaccaria (1457–1515), a good example of early Venetian Renaissance, others being the Courtyard of the Ducal Palace, the Scuola di S. Rocco, the Clock Tower, the Scuola di S. Marco, and the palaces mentioned in passing, of which the most representative is the Palazzo Vendramin-Calergi. This latter palace has none of that exuberance characteristic of the Lombard style at the early Renaissance period, resembling in its florid expansiveness the Certosa of Pavia. It may thus be seen that the contribution of Bergamo was large and conclusive. The term "Lombardesque architecture" does honour solely to the Solari of Carona and ignores the equally important part played by the Bergamasco at that time, as well as the work of local artists who were not Lombards, and this honour, if not undeserved, is at any rate too exclusive.

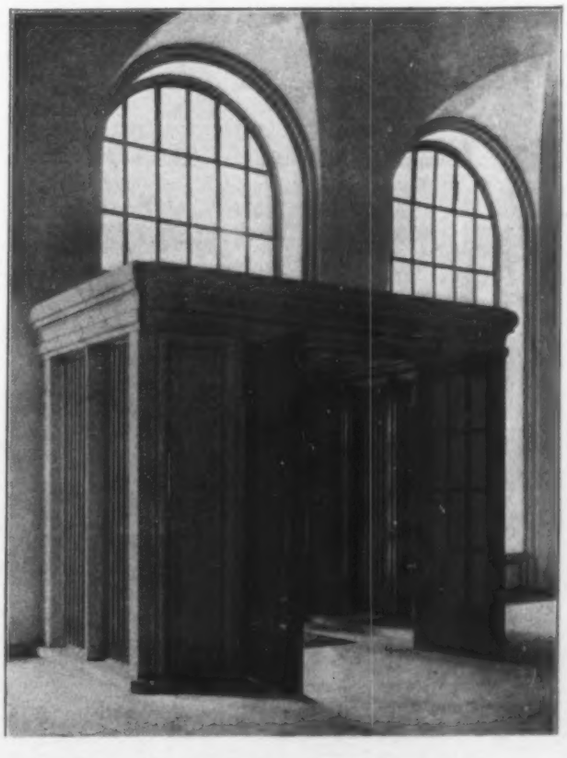
Venetian Renaissance architecture was a spontaneous growth of the Republic, the natural exponent of local grace, of internal and external influences—the living image of all that was Venice in the fifteenth century. No less than the paintings of Carpaccio, it represents "the Enchantress" as she was in the Quattrocento, luxurious and wealthy. On the one hand we have Antonio Rizzo, the Solari family, Bartolomeo Buon, Mauro Coducci, Marco Gambello, Giovanni Buora, and on the other Sansovino, Sammicheli, Palladio and Scamozzi.

The co-operation between architects and sculptors must not be overlooked, for the two worked hand in hand here. To obtain the best idea of the stones and marbles, examine the courtyard of the Ducal Palace or the interior of S. Maria dei Miracoli: capitals, pilasters, parapets, cornices, friezes, all afforded sculptors the opportunity for minute decoration. The diminutive size of these small, symmetrical reliefs is unequalled save in Florence, where lived sculptors whose names are closely associated with the beauties of Italy: Desiderio da Settignano, Bernardo Rossellino, Benedetto da Maiano, and Matteo Civitali. We may include in the same category the Sienese sculptors, led by Leonardo di Mariano, known as Marrina. Venice's own sculptors are on a level with the Tuscan masters, or not far behind them. Those who worked in the Republic are legion. They were excellent craftsmen, decorating stone and marble with a wealth of detail, their work being more remarkable for execution than inventiveness. Their patterns, taken from Roman models, are repeated over and over again and are typical of all Italian Renaissance carving. Tullio Lombardo is a sculptor of the first order, whose work must likewise be cited to exemplify early Renaissance. Specimens, both large and small, still exist, the latter being no less important than the former.

Tombs and Altars.

Tombs and altars follow similar lines, for the masters are the same. The Vendramin monument, by Antonio and Tullio Lombardo, leads us to this supposition, which is confirmed on further investigation. The two centres for these monuments in Venice are SS. Giovanni e Paolo and S. Maria gloriosa dei Frari. The monument to Doge Giovanni Mocenigo in SS. Giovanni e Paolo, which is possibly later than the Vendramin, is another example of Tullio Lombardo's work, and, adding to the glory of Pietro Lombardo and his sons Antonio and Tullio, who assisted him, there is the monument to Doge Pietro Mocenigo, one of this celebrated artist's masterpieces. SS. Giovanni e Paolo furthermore contains the monument to Doge Pasquale Malipiero, by an unknown artist, and one to Dionigi Baldo by Lorenzo Bregno, the remainder including that to Doge Niccolò Marcello, transferred from the Church of S. Marina. Amongst the Frari monuments must be mentioned the one to Doge Tron and that to Doge Jacopo Marcello, a celebrated fifteenth-century marble attributed to Antonio Rizzo. Venetian sepulchral monuments frequently exceed the ordinary lines of tombs, both as regards architecture and sculpture, and take on the aspect of façades, like those to church and palace, having several stories, with niches, statues, and pediments. They thus form a complete contrast to the Roman tombs, which sculpturally and chronologically are less ancient than the Venetian monuments.

We see, therefore, that the beauty of Renaissance stones and marbles in Venice cannot be fully appreciated without an examination of this work of secondary importance, which amplifies and enriches the patrimony of the city with every form of art, from the structural lines of architecture down to figures and ornament, including even painting. Indeed, some Venetian tombs are adorned with frescoes in designs that add to the importance of the composition and the magnificence of the style, and, I repeat, these monuments are a special feature of the City of Water, Silence, and Colour.



University of Zurich: Windscreen at Main Entrance.

MESSRS. CURJEL & MOSER, Architects. (*See p.* 12.)

THE COST OF BUILDING.

TWO COMPETITIONS—£300 IN PRIZES.

HIGH rents, inflated rates, and the reluctance of landlords to do repairs even of the most necessary character, have conspired to fill the English householder with an uneasy sense that he is being subjected to an intolerable burden. It is borne in on him that he ought to take action in self-defence, and, though the nature of that action is apt to seem elusive under pressure of the conditions of house shortage, one ideal is bound to emerge into prominence —the desirability of possessing a home of his own. A great number of people in this country are feeling this reaction against leasehold or rented property, and many are restrained from giving their wishes permanent form in house-building in the belief that the actual cost at the present time of material and labour is too high to justify building operations. An even greater number are deterred by the uncertainty of the cost and the fear of unforeseen extras. The attraction of certainty in regard to the extent of financial outgoings is exploited successfully by the vendors of temporary or semi-permanent huts and bungalows to standard types of design, and it is desirable that the more permanent types of construction should share this advantage.

The feeling that prices will soon drop, and that if one hastens to enter into a contract one will have strained his resources unduly and be in the position of having paid dearly through impatience for what one could have obtained cheaply by taking matters more slowly, is responsible for the delay of much house-building. Opinions differ as to the probability of a continued fall in the cost of house-building, and some uncertainty as to prices is inevitable even under the most stable conditions, but, in the belief that a fuller knowledge of building costs may be obtained, *The Builder* is promoting two competitions for architects to design and for builders to estimate for the erection of dwelling houses containing three and four bedrooms respectively, such as would have been let pre-war at rentals of £19 10s. and £36 per annum. Competitors will be required to state the cubic contents of the houses shown in their designs, but must use their discretion as to the actual size.

The purpose of the first competition, open to architects, is to encourage house-building by demonstrating that it is possible to obtain substantial houses on an economically sound basis and to direct the attention of architects to that side of house-design which deals with the provision of convenient accommodation at reasonable cost, and which obtains its artistic expression from the practical necessities of the case and from the right use of the materials of construction.

The second competition, open to builders, is promoted for the purpose of clearing up the present uncertainty as to the cost of house-building. We are assured that the publication of detailed estimates for the erection of houses from the designs produced in the first competition will inspire confidence in the house-building public and will result in increased trade to builders and merchants.

Prize money to the amount of £300 has been offered by a donor who wishes to withhold his identity until after the final competition. All other expenses in connection with the competitions are being defrayed by *The Builder*.

First Competition.

A premium of £75 will be paid to the architect submitting the best design for a house in each class, (*a*) and (*b*), and architects may compete in both classes at their discretion.

An assessor will be appointed from nominees of the Royal Institute of British Architects.

The *Conditions of Competition* may be obtained on application by filling in the *coupon on page cliii*, and forwarding it to the Editor of *The Builder*, 4, Catherine-street, Aldwych, W.C.2. Envelopes to be marked "Application for Conditions, Cost of Building Competition, No. 1."

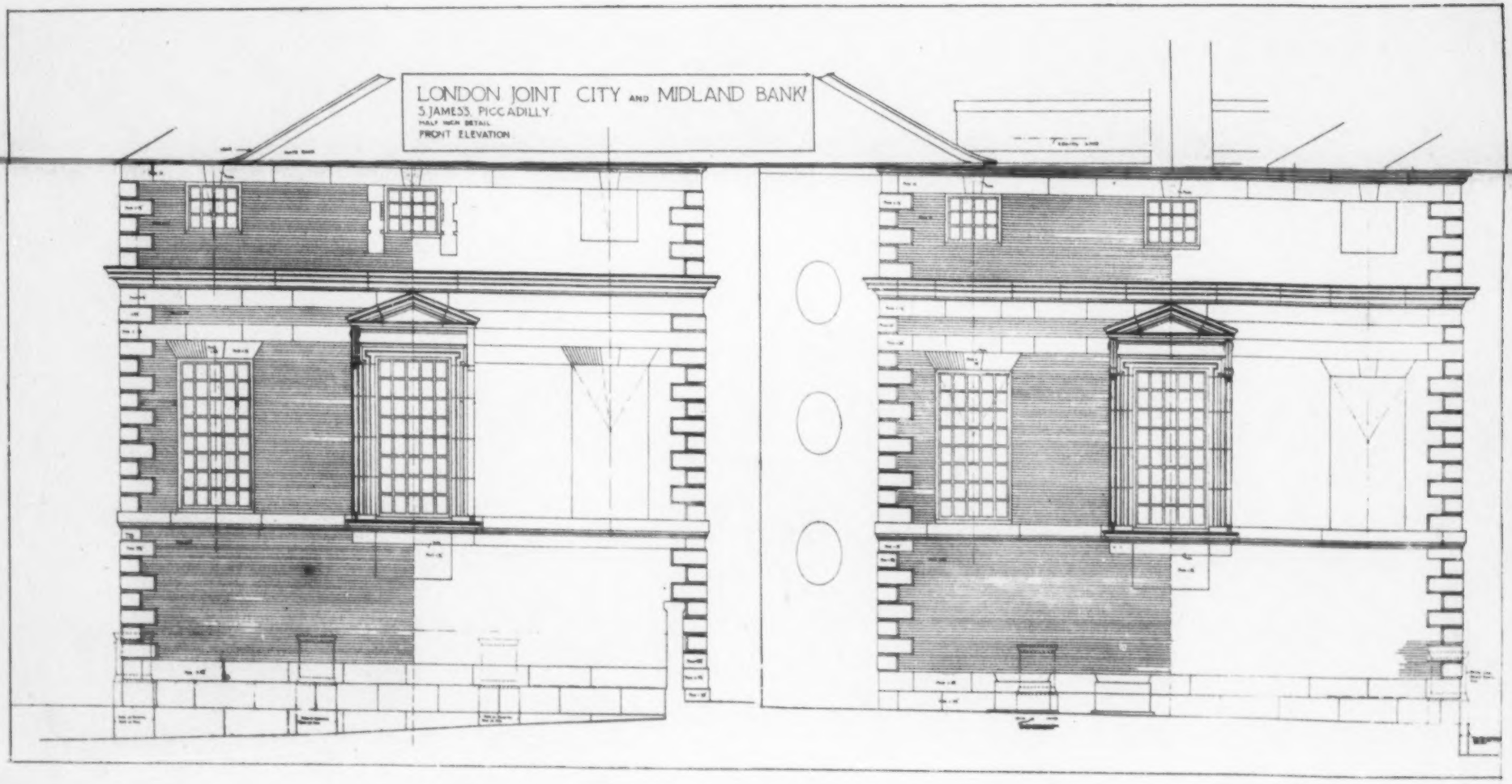
Second Competition.

A premium of £75 will be paid to the builder submitting the best but not necessarily the lowest tender for a house in each class, (*a*) and (*b*). Builders may compete in both classes at their discretion.

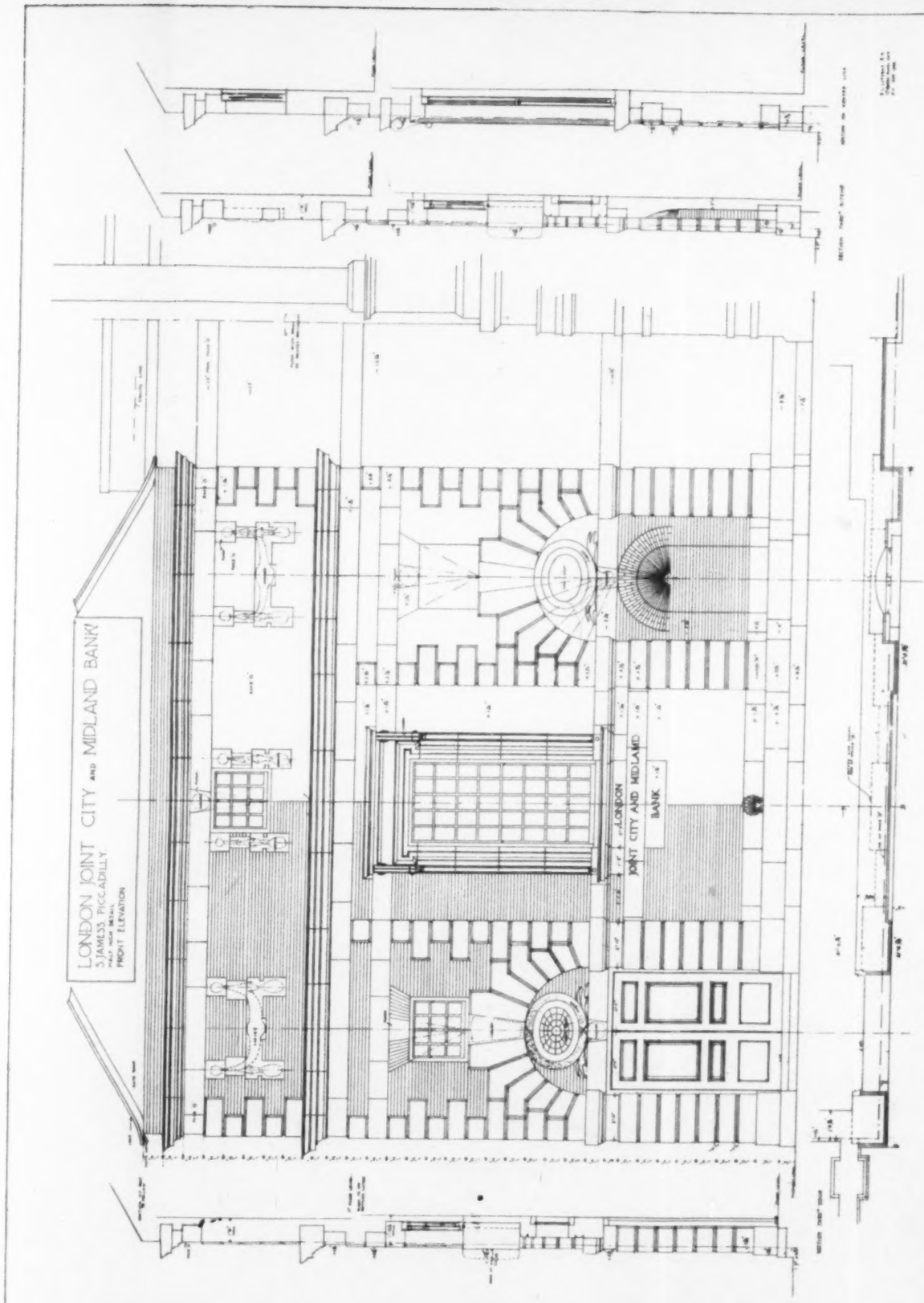
Conditions of Competition will be procurable after the completion of Competition No. 1.

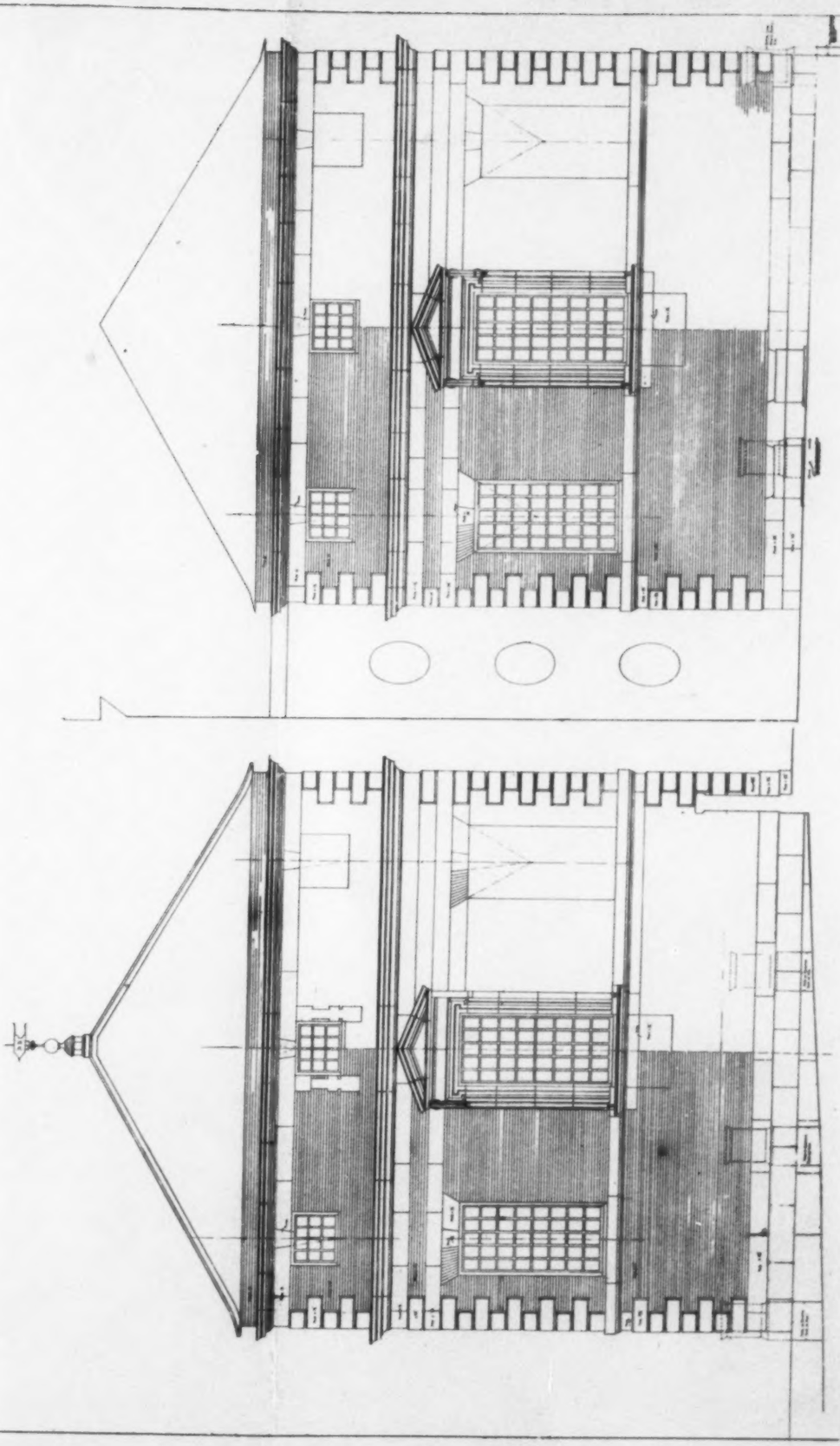
No promoter of the competition and no assessor engaged upon it will compete or assist a competitor or act conjointly with a competitor in the proposed work.

Oxford Circus, from Jay's Corner.



ELEVATIONS BY SIR EDWIN LUTYENS, R.A., MR. T. E. WHINNEY, F.R.I.B.A., ARCHITECT TO THE BANK.





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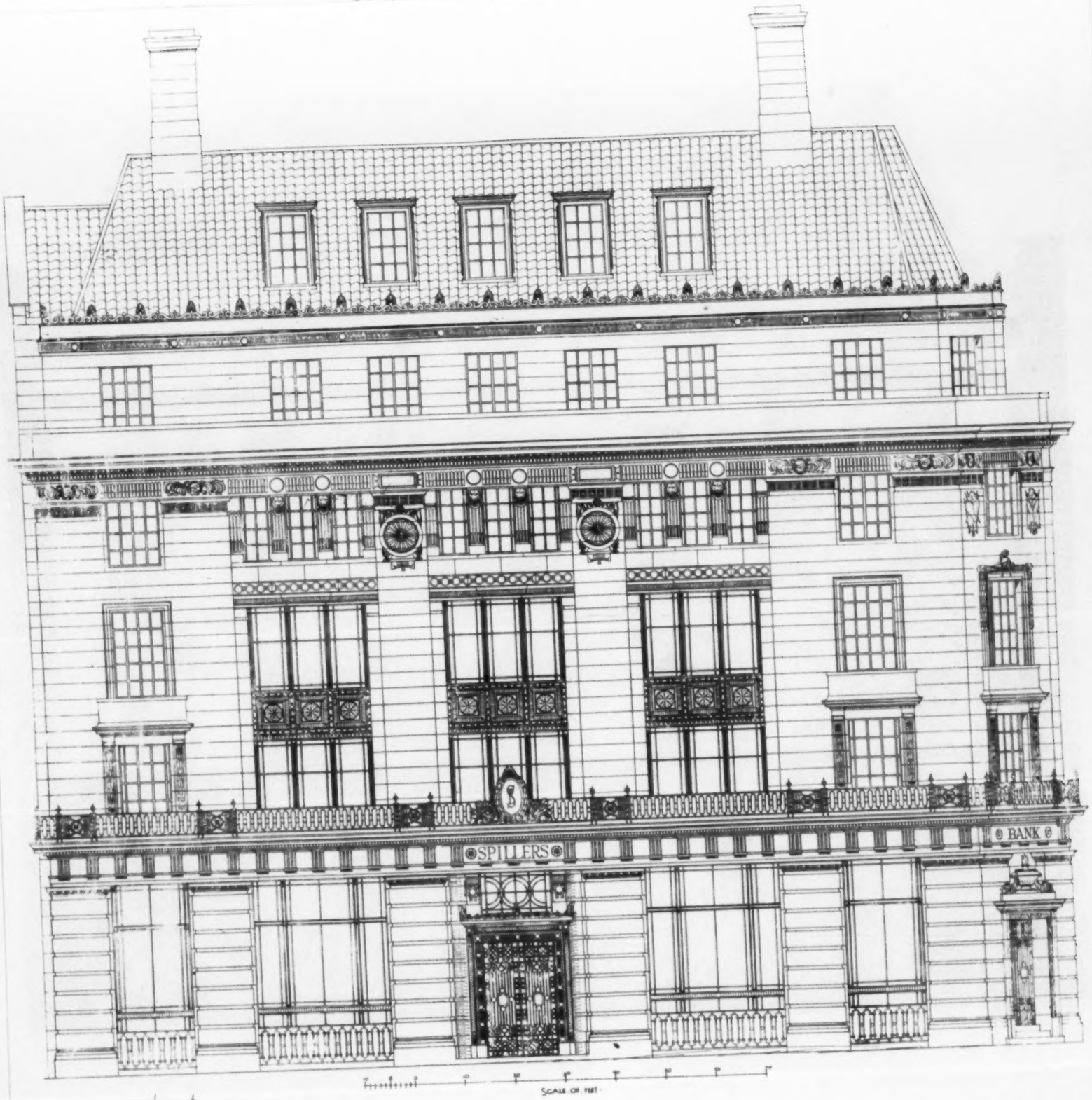
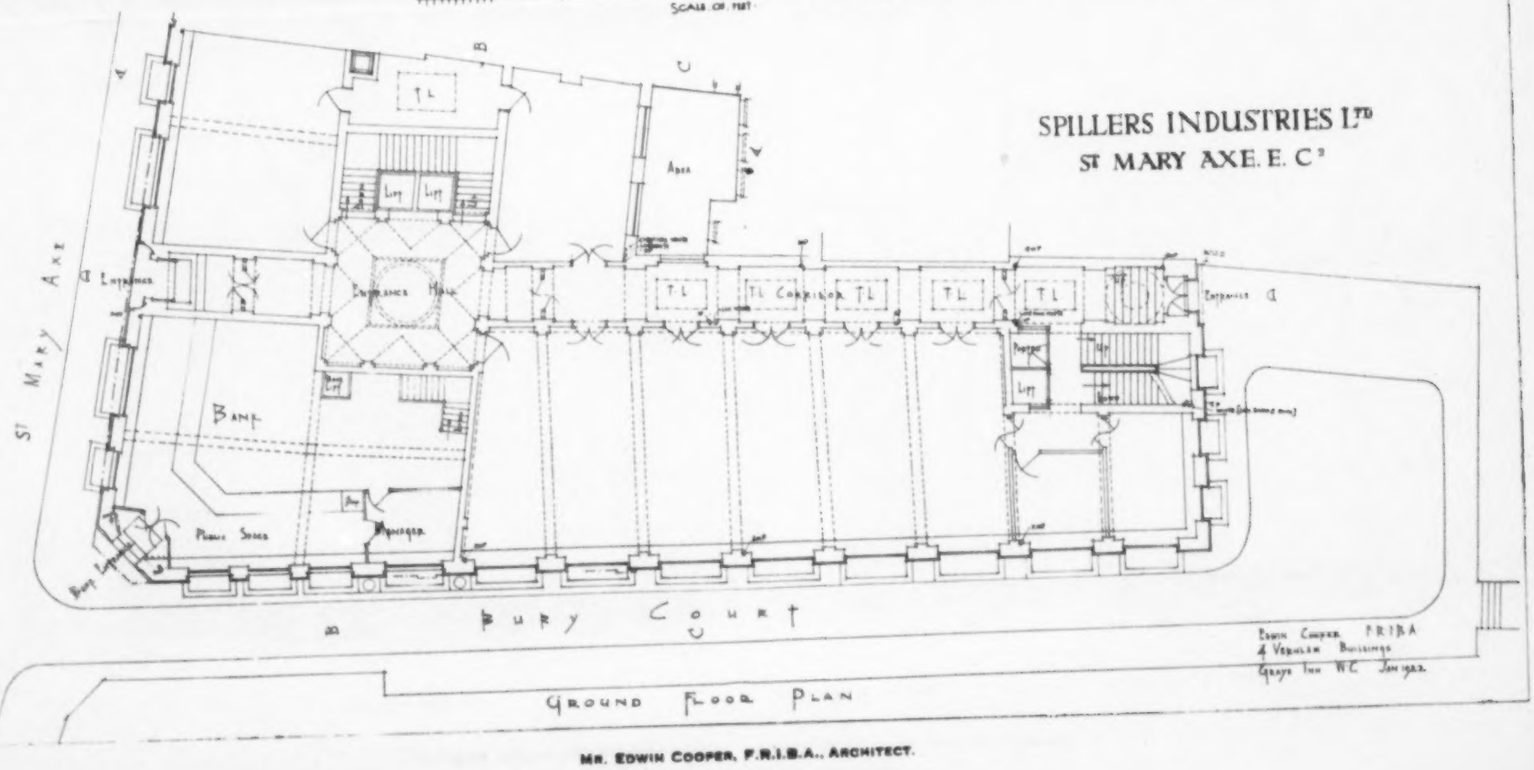
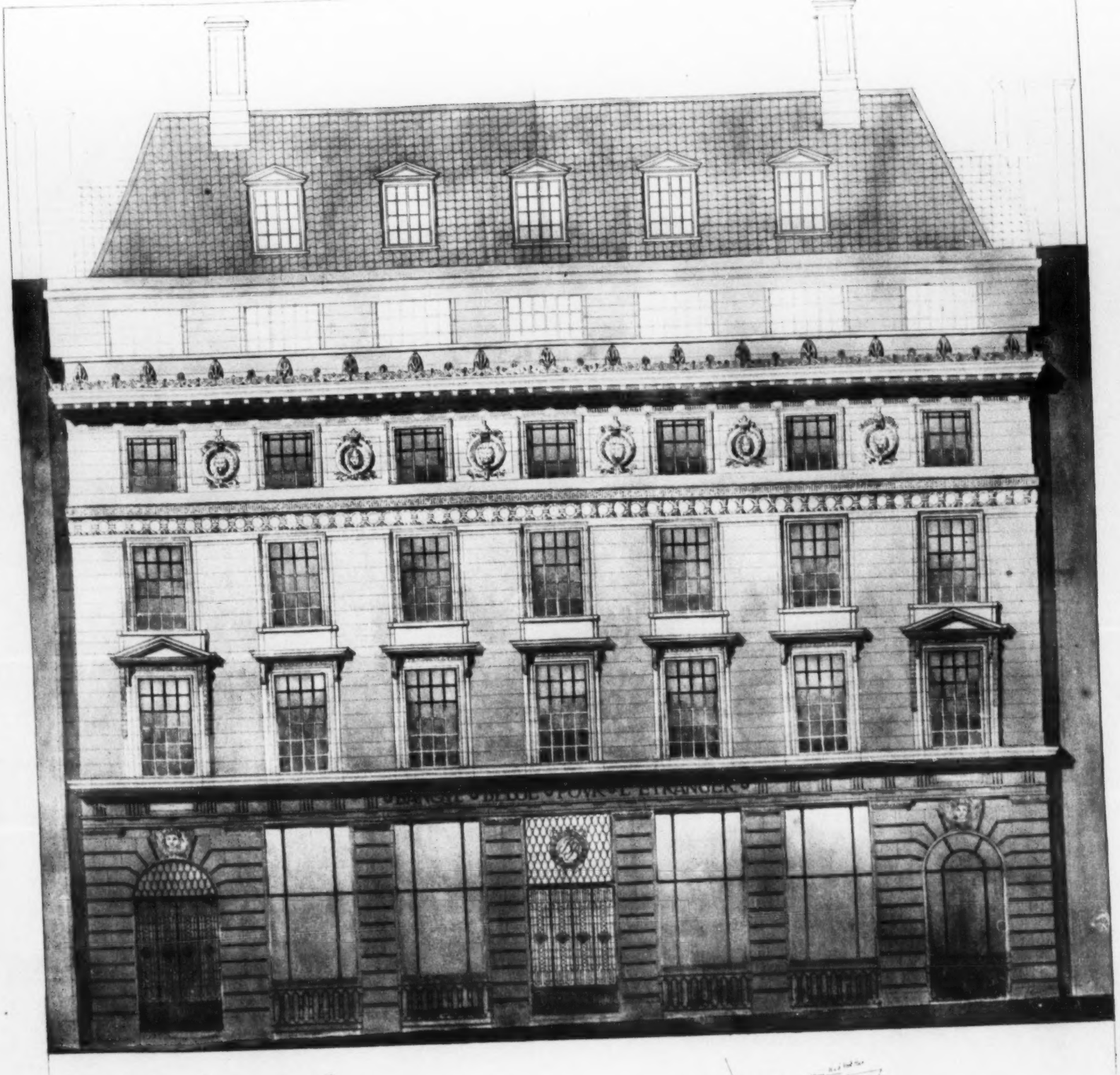
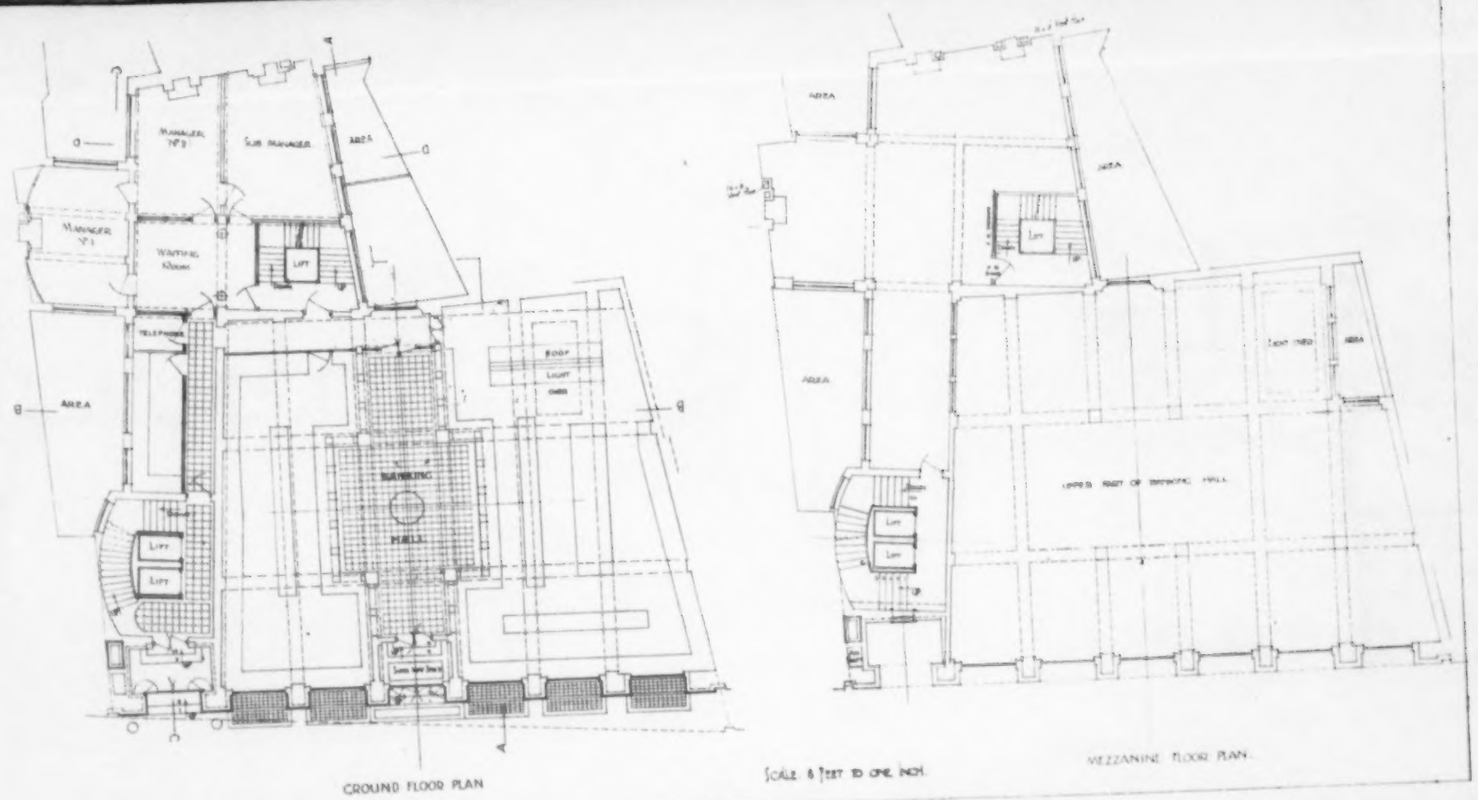




MR. EDWIN COOPER, F.R.I.B.A., ARCHITECT.





GROUND FLOOR PLAN

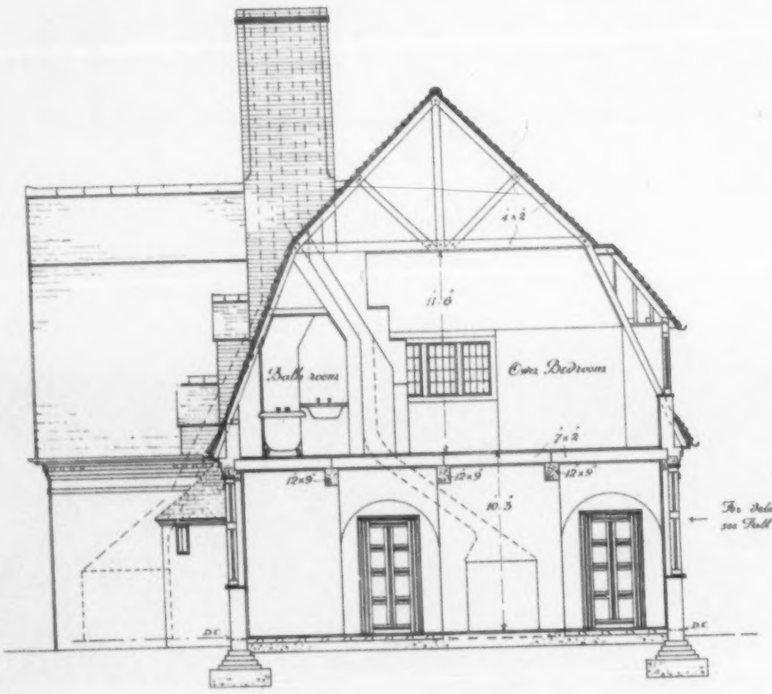
SCALE 8 FEET TO ONE INCH.

MEZZANINE FLOOR PLAN.

"BANQUE BELGE POUR L'ETRANGER," BISHOPSGATE: DETAIL OF FAÇADE.

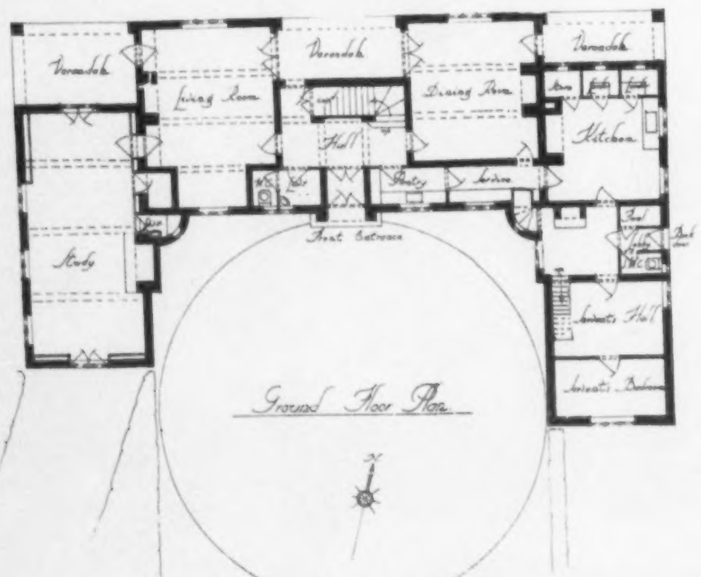
MR. EDWIN COOPER, F.R.I.B.A., ARCHITECT.

Entrance Elevation



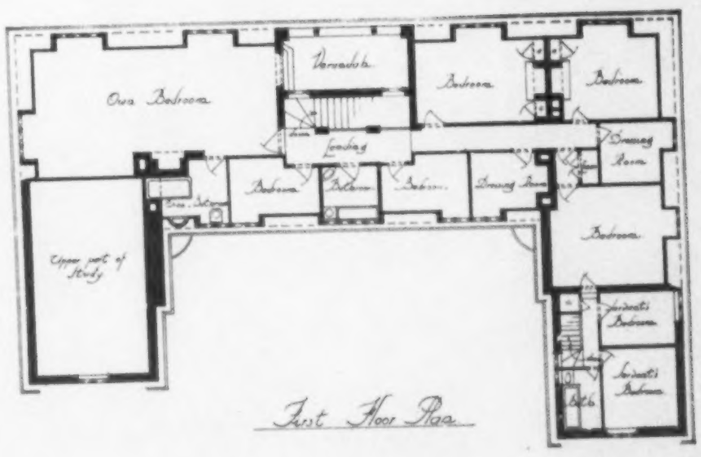
← For Details of Windows see Detail page (PA) No 6. →

Section through Living room etc.



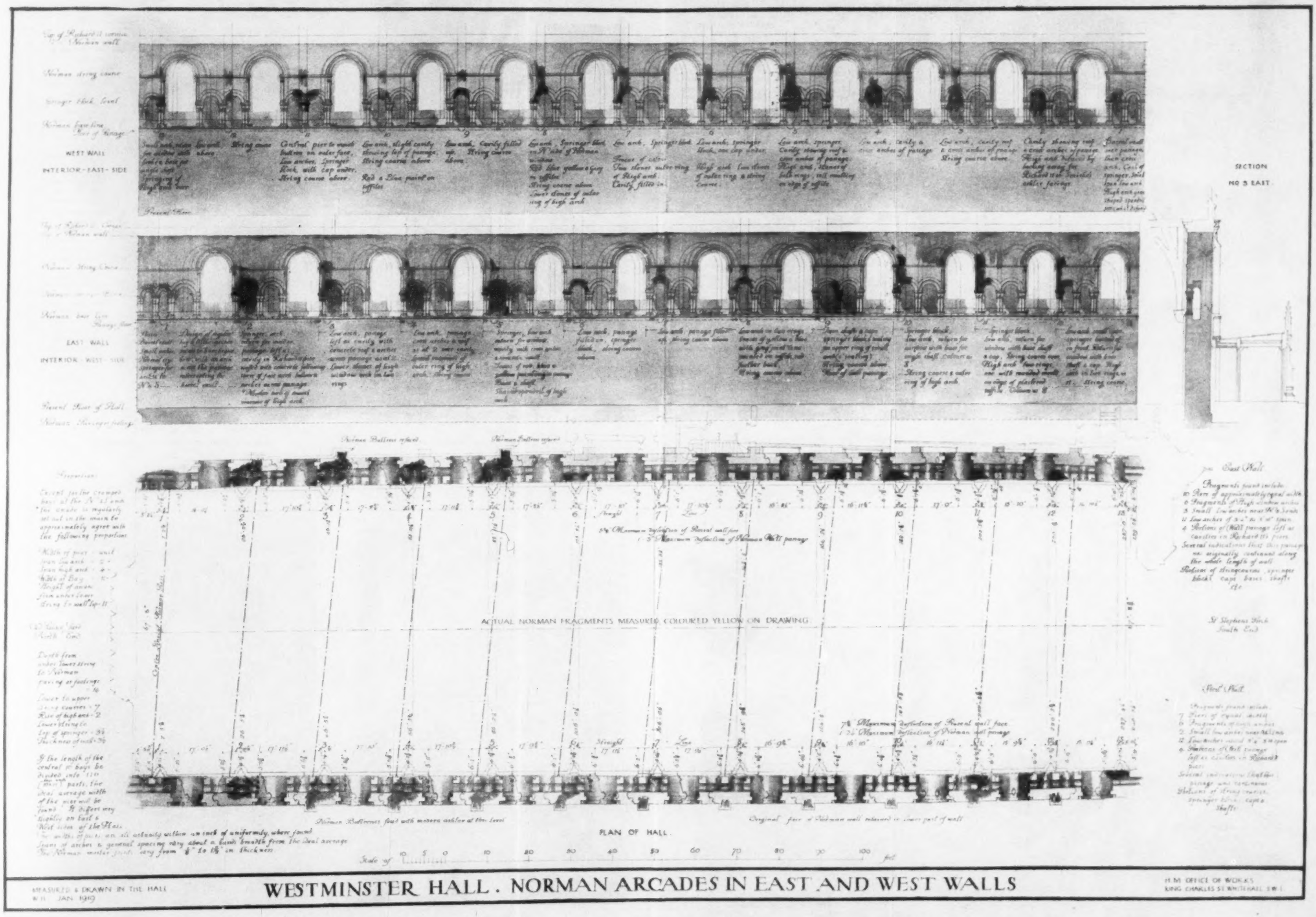
P. Tilden Esq. Architect
1 Portman Crescent - Slough
Plans commenced May 1921
Completed January Sep. 1922

Kitchen Elevation



HOUSE, CHURT, FARNHAM, SURREY, FOR THE RIGHT HON. D. LLOYD GEORGE.

MR. PHILIP TILDEN, ARCHITECT.


WEST WALL
INTERIOR - EAST - SIDE
EAST WALL
INTERIOR - WEST - SIDE
SECTION
NO 5 EAST
Norman Buttress refaced
Norman Buttress refaced
ACTUAL NORMAN FRAGMENTS MEASURED COLOURED YELLOW ON DRAWING
PLAN OF HALL
Scale of 10 5 0 10 20 30 40 50 60 70 80 90 100 feet

WESTMINSTER HALL . NORMAN ARCADES IN EAST AND WEST WALLS

MEASURED & DRAWN IN THE HALL
W.H. JAN. 1919

H.M. OFFICE OF WORKS
KING CHARLES ST WHITEHALL S.W.1

Fig. 1.

This Plan incorporates information obtained in the earlier investigations. Uncoloured outlines show 14th century and later work
Note positions of pointed arches in relation to round arches.

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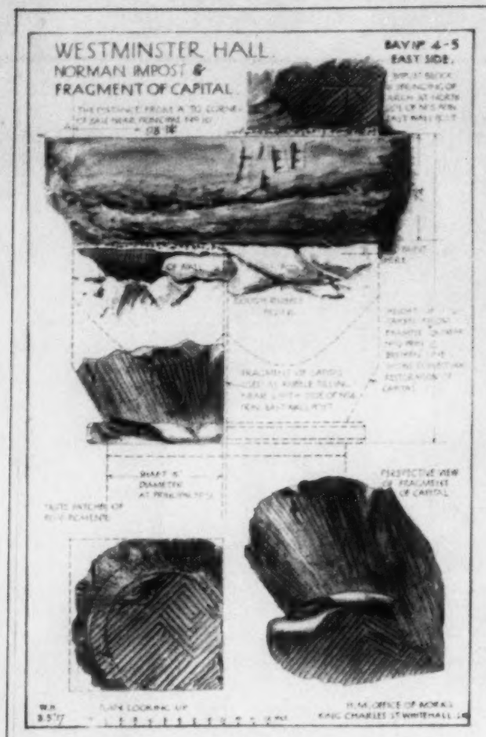


Fig. 2.
Fragments of Abacus and Capitals. Note careless 14th century rubble underpinning.

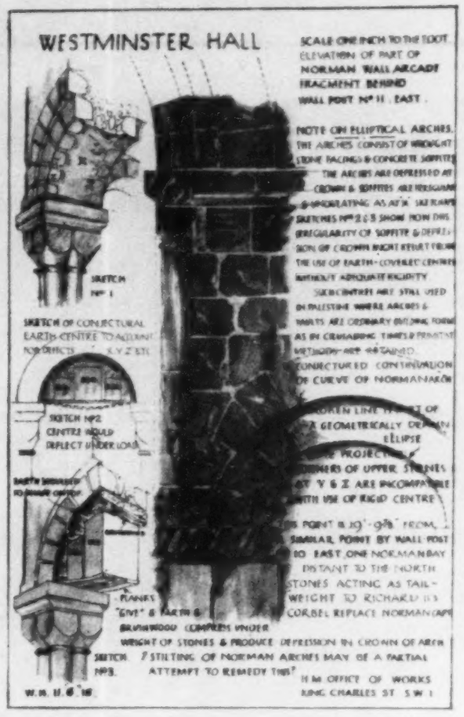


Fig. 3.
Irregular mortar joints and arch curves.

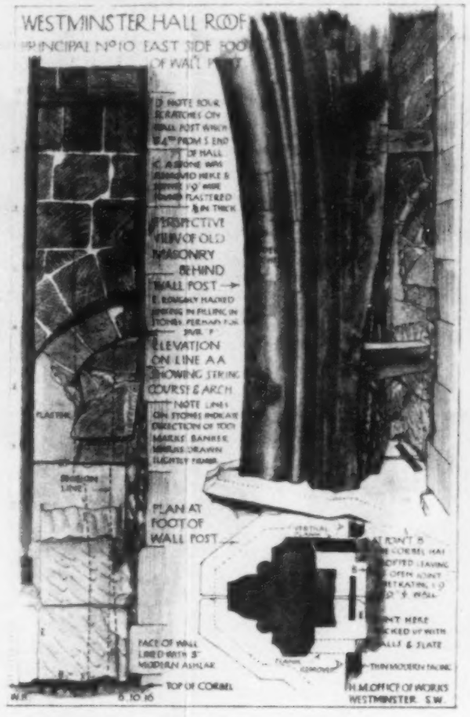


Fig. 4.
Norman arch with 14th century underpinning.

Fig. 5.
Skim coat of plaster, colour wash, and mason's marks

Fig. 6.
Excavations in window cill to floor of Norman Passage.

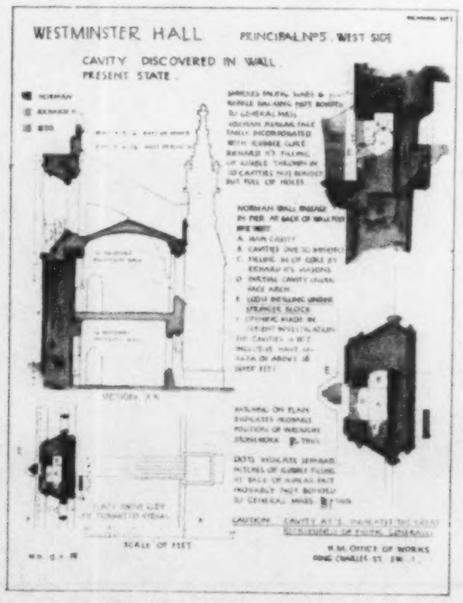


Fig. 7.
Cavity in wall shown in plans and sections.

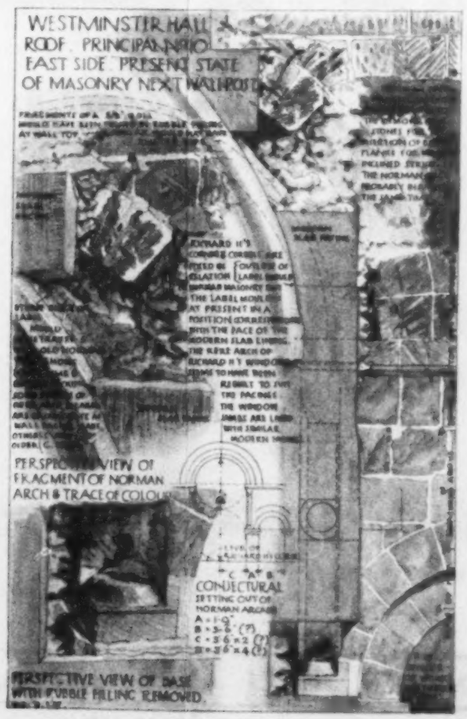
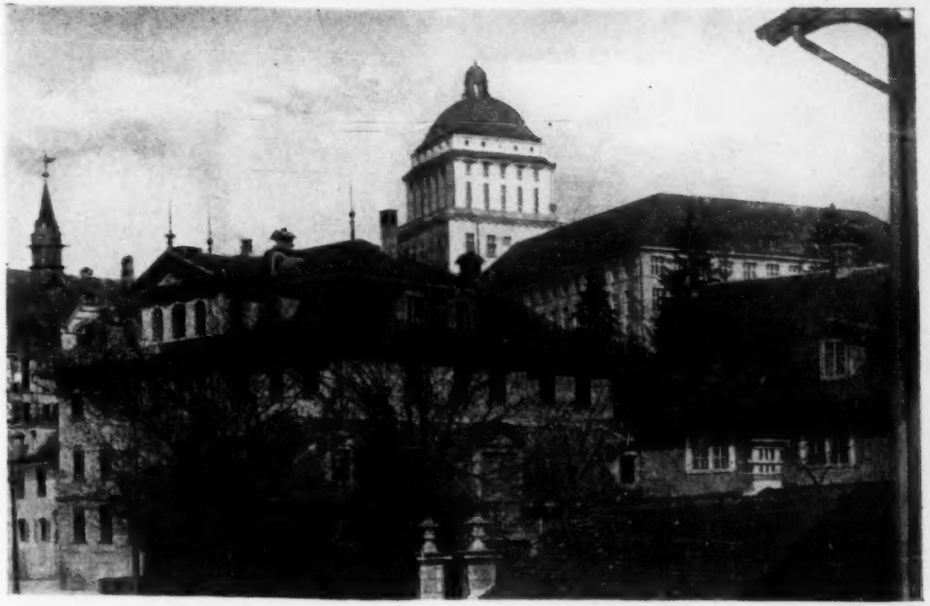


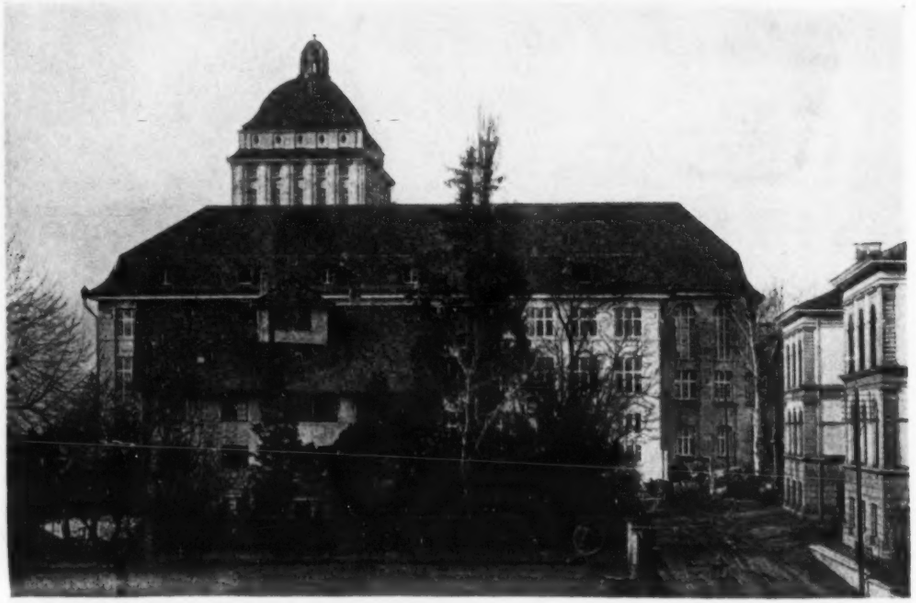
Fig. 8.
Fragments of low and high arch of arcade with base for nook shaft.

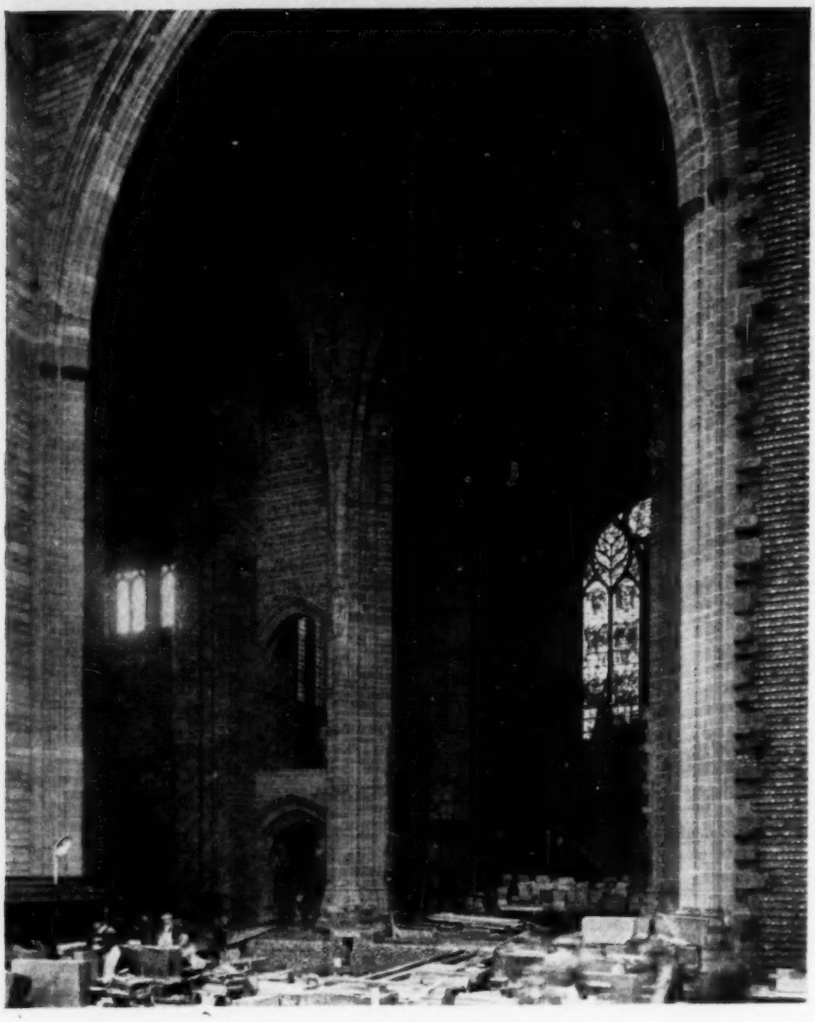
Fig. 9.
Twin columns with defaced Capitals and Abacus found in position.

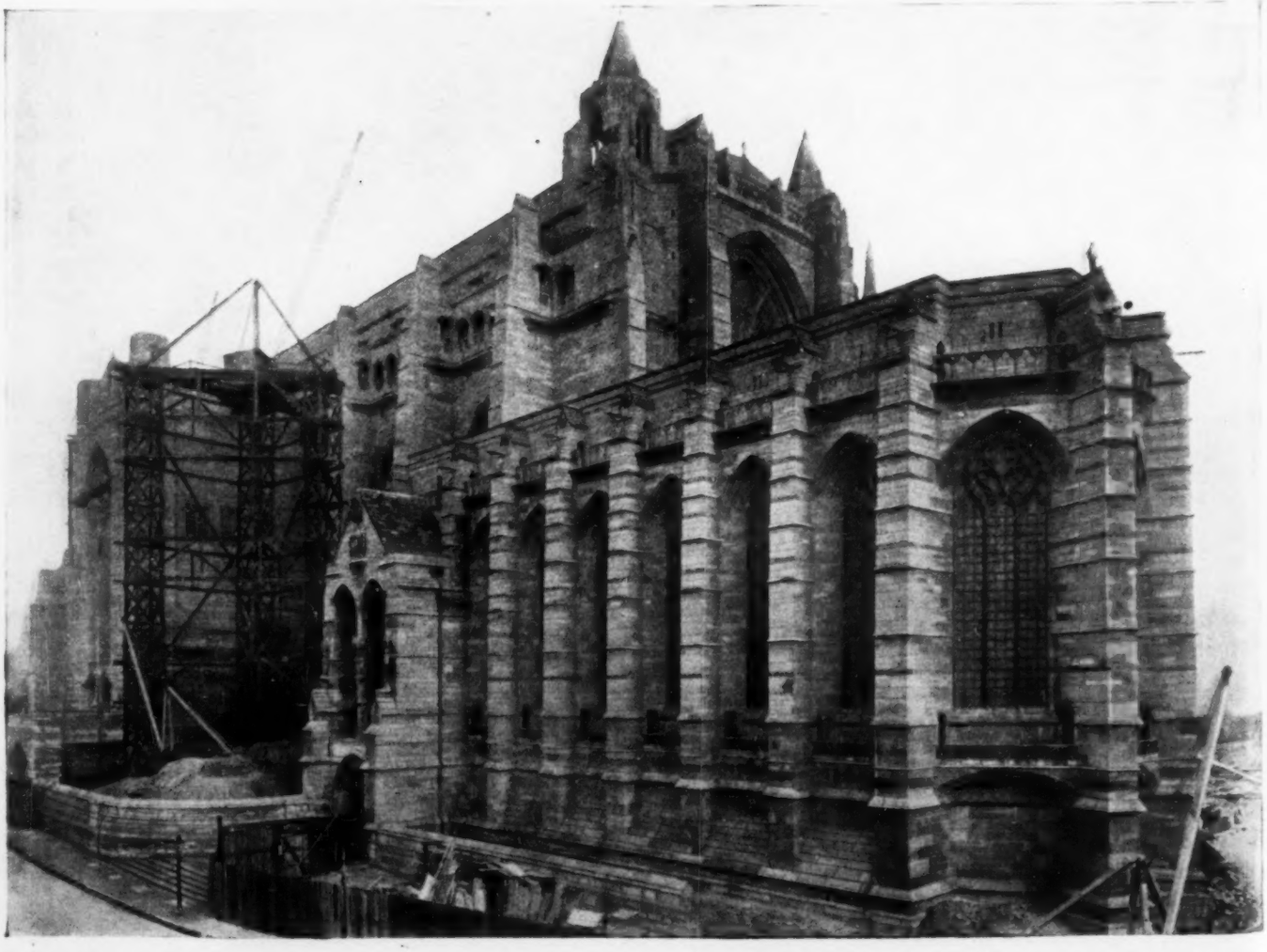
VIEW FROM THE EAST.



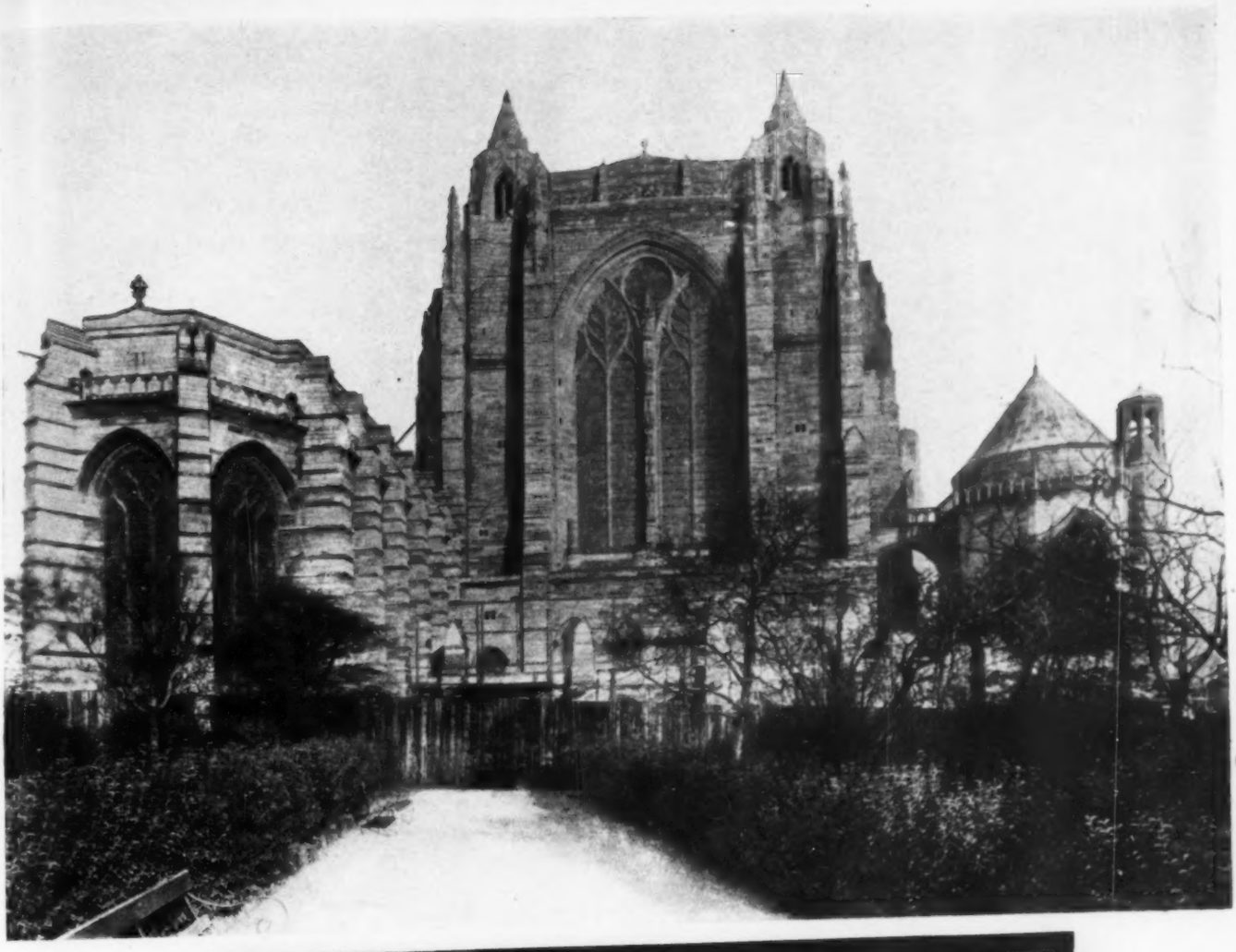
VIEW FROM HIRSCHENGRABEN.

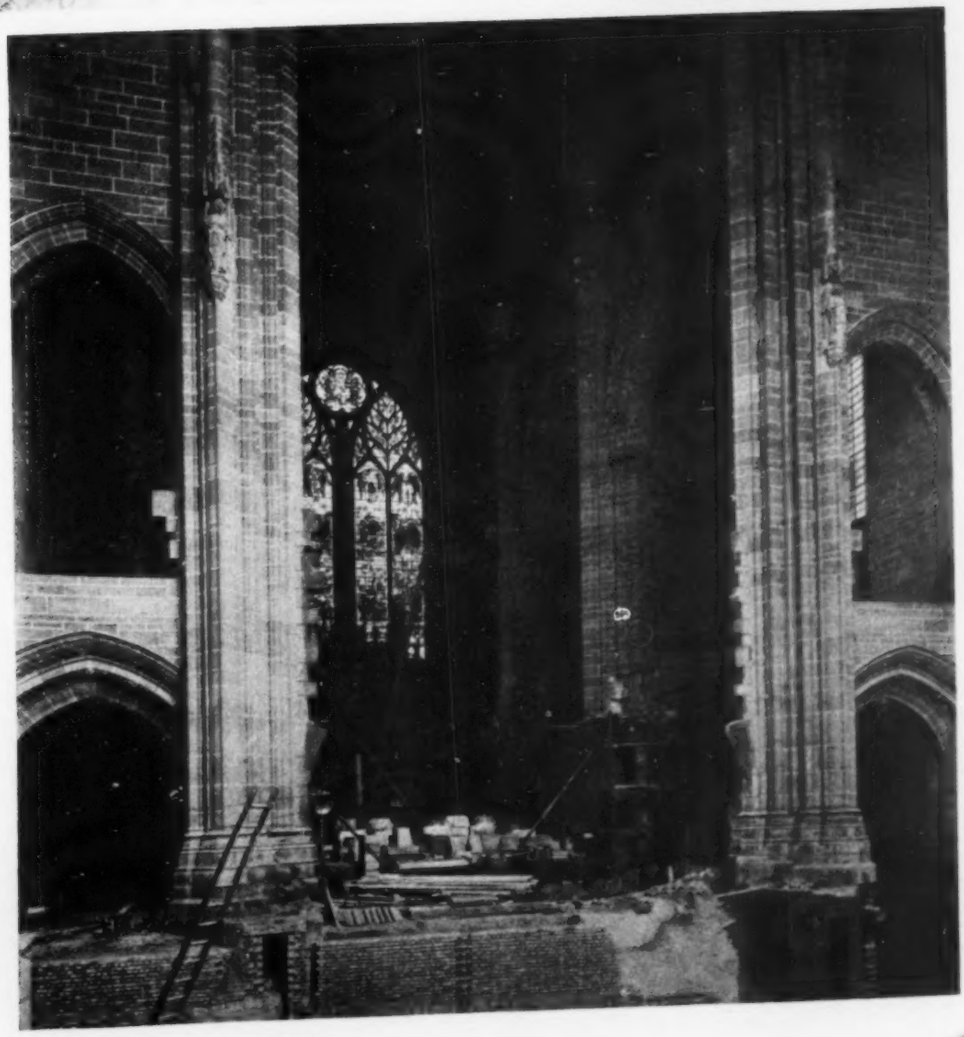






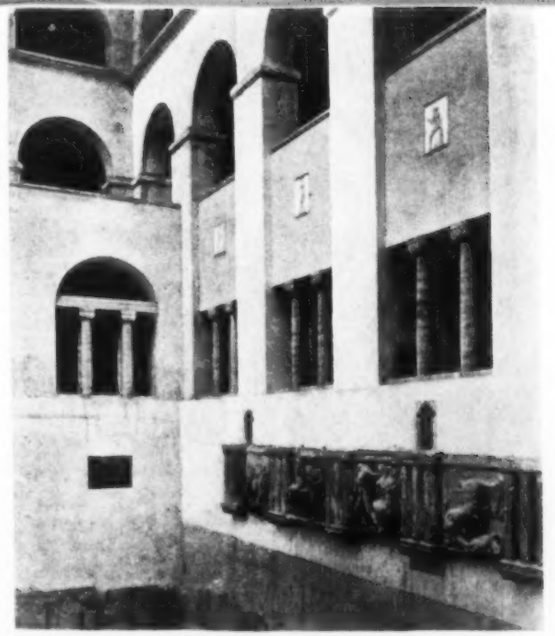
LIVERPOOL CATHEDRAL: RECENT VIEWS TAKEN F



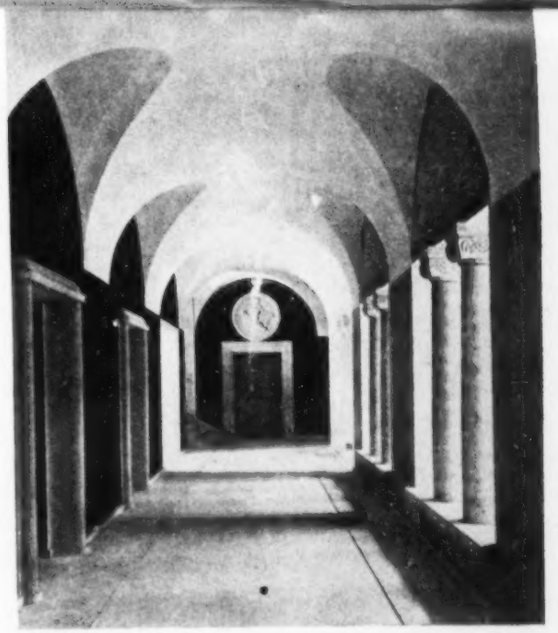


KEN F "THE BUILDER." Mr. G. Gilbert Scott, R.A., Architect.

Hall on Ground Floor.

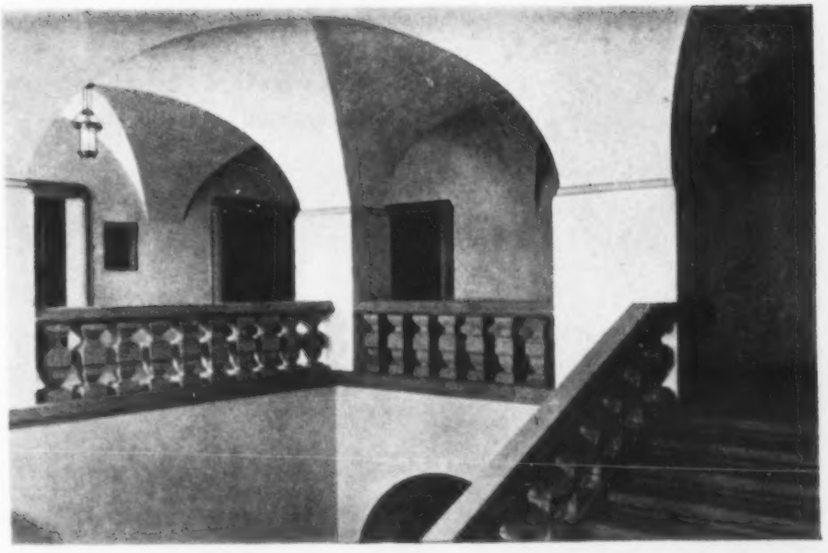


Hall in College Building.



Corridor.

Entrance Hall in the Biological Institute.



Well Staircase in Biological Institute.

UNIVERSITY OF ZURICH. Messrs. Curjel & Moser, Architects.

THE LONDON ASSURANCE BUILDING, KING WILLIAM STREET, E.C.
MESSRS. CAMPBELL JONES, SON & SMITHERS, Architects.

THE GUARDIAN ASSURANCE AND LLOYDS BANK BUILDING, KING WILLIAM STREET, E.C.
MESSRS. CAMPBELL JONES, SON & SMITHERS, Architects for Lloyds Bank; MR. H. L. ANDERSON, Architect for the Guardian Assurance Co.

Some Recent London Buildings.

THE £150 BUNGALOW.

A FEW days ago *The Times* contained an article describing a working class dwelling which could be built for £150 and which could be let at an economic rent. We are able this week to illustrate the design (which is by an architect who wishes to remain anonymous), and take the following notes from *The Times* article:—

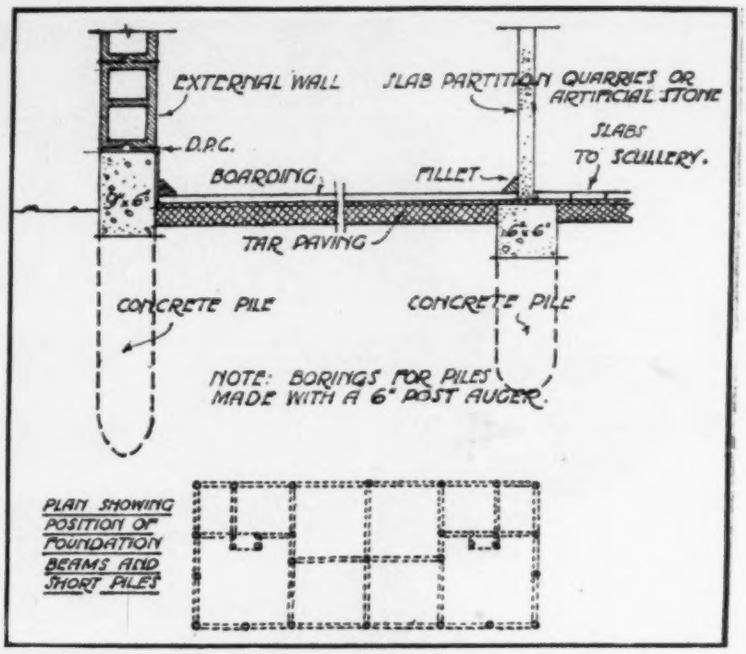
"The plan could be varied in detail to suit the materials, customs, or special facilities of different localities. Where land or paving costs would be disproportionately high, the same plan could be used for flats on two stories, with the necessary stairs.

"The design provides for two bed-rooms, a living-room (which could be used for an extra bed when necessary), a washhouse, a pantry, a coal-bin, and a w.c. There is one water-tap and it is in the scullery. There is not a bath-room, but there is a fixed tub in the wash-house which can be used as a bath and as a wash-tub—water is not laid on to this—and there is a copper. The cooking-range in the living-room is the only fireplace in the house (except the copper furnace), though, at little extra expense, flues for gas-fires may be built into the bedroom walls, opening through ventilating bricks into the open air at eaves' level. Bedroom fires are seldom used; while, in this house, if the doors communicating with the living-room are left open for an hour or so in the evening, the bedrooms will be warmed.

"The cottage is designed as a bungalow, because a two-story house of its size would not be so cheap. There is a critical size in houses, below which the bungalow type is cheaper, and above which the two-story house is cheaper. A house that will only cost £150 to build, when the proper cost of land, &c., has been added, ought to be rented at not more than 10s. a week, probably less, inclusive of rates."

The following is the specification in brief:—

FOUNDATION.—Short piles at 6 ft. intervals under external and internal partition walls formed by pouring cement concrete (1-8) into borings about 2 ft. deep made with a post auger. The heads of the piles under the walls to be connected by a 9 in. by 6 in. concrete beam (below floor level in the case of internal partitions). The brick chimney breast in living-room to be carried on a 6 in. concrete raft with a group of four piles under.



Pair of Labourers' Cottages: Suggested Floor and Foundations.

FLOORS.—To be of 2 in. well-rolled and levelled tar paving throughout, on rammed earth underfloor or filling where necessary, with 1 in. T and G boarding laid over in living-room and bedroom, and 9 in. by 9 in. quarry tiles laid over in scullery; or to be of 4 in. concrete (1-8) throughout, rendered with cement and sand (1-3) in living-room and scullery, and with floated finish elsewhere, and lino, cemented down in bedroom.

WALLS.—External walls of 6 in. hollow terra-cotta blocks or 9 in. solid brick walls, distempered both sides; internal partitions of 2 in. breeze concrete blocks distempered both sides.

ROOF COVERING.—Marseilles tiles on battens or asbestos-cement tiles on boarding.

WINDOWS.—Standard metal casements.

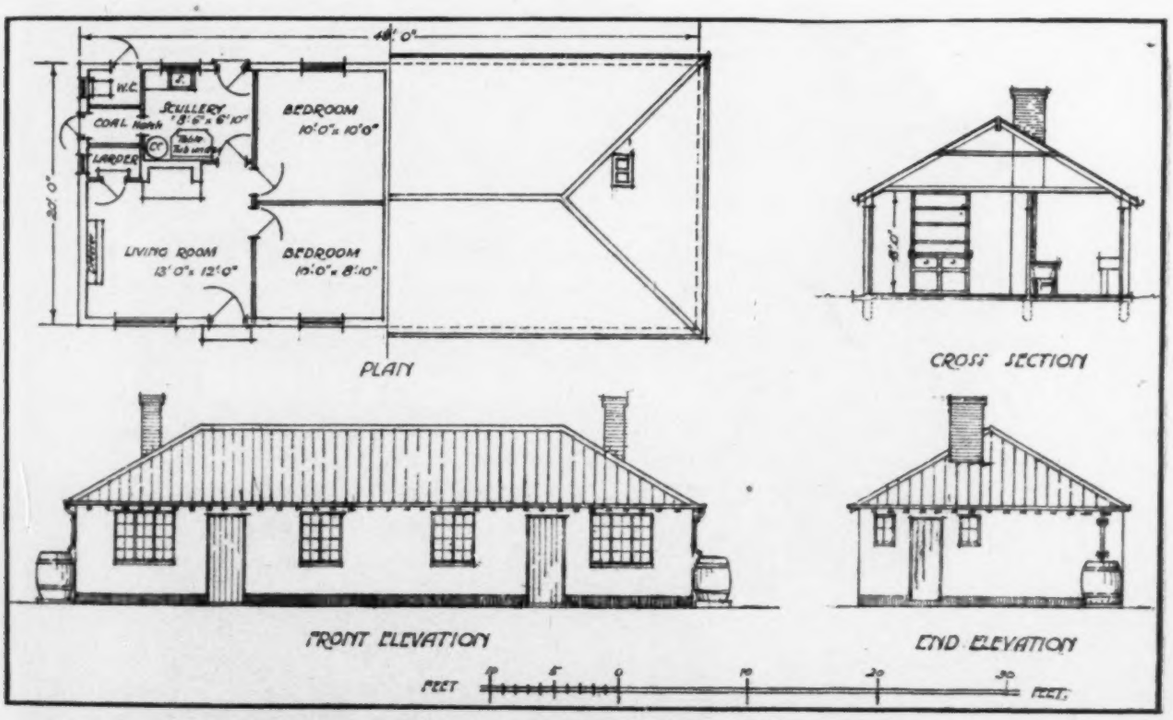
DOORS.—Ledged and braced.

FITMENTS.—Living-room: "Eagle" or similar range; dresser. Scullery: Six-gallon copper; table with hinged top with wash-tub under; 24 in. by 18 in. salt-glazed sink and draining board.

DRAINAGE.—A common drain for two cottages with one disconnecting chamber.

Architect's Estate.

Mr. Richard Edwards, of Brynhenlog, Treharris, Glam., architect and surveyor, left estate value £7,011.



Pair of Labourers' Cottages: Approximate Contents, 10 560 cubic feet.

STEEL FRAME OR CONCRETE FRAME BUILDINGS?

BY R. N. STROYER, B.Sc., M.I.Mech.E.

WHEN reviewing the progress of the concrete frame building as compared with that of its fellow, the steel frame building, during the seven years that have elapsed since the official appearance of the L.C.C. Regulations for Reinforced Concrete, the result is not quite so gratifying from the concrete engineer's point of view as it might be. The concrete frame building does not take the eminent position that might reasonably have been expected from the combination of cheapness, fire and weather resistance, strength, durability, and other excellent qualities possessed by the building material for which the regulations were framed. One need only look round London to-day to notice the predominance of the steel framing in use on the new buildings now in course of erection, while the concrete frame is more noticeable by its absence. To anyone interested in the progress of reinforced concrete as an industry, and also in the use of a really most suitable building material, the scarcity of concrete frame buildings must come as a disappointment after the rich promises and example set by the Continent and America, where reinforced concrete buildings are far more in vogue than here. We have here a material that lends itself admirably to the creative imagination of the architect and the artist, far more than is realised by the many who still promptly hide every trace of concrete behind a veneer of brick or stone instead of trying to use to advantage its plasticity and its potentialities for decorative art. Further, concrete is a cheap material, is strong, durable, free from the cost of maintenance—and yet it seems to lag behind sadly in the race with steel.

After having ascertained this discouraging fact, one naturally casts about to try and find the reasons why the concrete frame is not used far more extensively for ordinary building purposes—as distinct from strictly utilitarian buildings, such as factories, warehouses, &c. The building contractor will generally say that speed of erection is one of the factors that militate against the use of reinforced concrete; he will probably also maintain that it entails more trouble, more supervision and administration to put up a concrete building than a steel frame building. The architect and the client alike are against the heavy columns often necessary in the lower floors, and the generally bulky structural formation of concrete as compared with steel; the difficulty of altering or cutting into a concrete structure once it is up is also brought forward to its detriment. On the score of cost there is not much to say either way, except that a well-designed concrete building should be the cheaper of the two.

Looking at the question of speed of erection, there undoubtedly appears to be a good deal in the builder's contention. The erection of the false work, the waiting for the concrete to set before it can be used for support, &c., are no doubt time-wasting contingencies, but knowing this to be a necessary evil, a good deal more can and should be done right from the start by the builder tackling these difficulties with a firm determination to overcome them.

I would here like to put in a word for a little more thought and care to be spent on the false work than is generally done. Most frequently the whole of this is left to the foreman or the carpenters, who, however capable in many other respects, may not have just the exact ideas required to lighten and speed this particular part of the job, and cannot perhaps be expected to deal with this question in quite such a detached manner as the drawing office would do. For any but the simplest and most straightforward centering it is certainly advisable that it should be treated in the main lines in the drawing office—not by a junior tracer, of course, but by a really practical designer, and in consultation with the foreman, so as to allow considerations as to working space, &c., to fit in. An hour spent in this way may often save days on the job, and if the centering, the beam casings, the strutting, the slab panels are designed with a view to quick freeing and frequent repeating, and the arranging of the struts to remain so as to be as little as possible in the way of other trades, there is really no reason why a well-planned centering scheme should not allow the concrete erection to hold its own in regard to speed. When an important structure, such as a large arch bridge, is being planned the contractor would not dream of leaving the centering to the foreman, but would naturally insist upon its being treated as just as important an item as the bridge itself, structurally—so why not spend the same care and thought on an item in a building which, perhaps not structurally, but financially plays such a very important part?

The question of supervision, &c., need really not be taken seriously if it is only realised that reinforced concrete work is special work, and that it requires special workers to perform it, just as steel erection does. The more unskilled labour, the more supervision is required, and *vice versa*. The contractor can always have specialist workers if he wants them, and if he tries to do a specialist job with ordinary labour the trouble he mentions will surely arise.

Generally speaking, the L.C.C. Regulations are admirable for the purpose of ensuring good sound practice in reinforced concrete design and execution, and have no doubt been instrumental in preventing such failures as might have been due to lack of attention to both the former. It is undeniable that there have been failures in the past, but they have always been due to faulty design, materials, or workmanship, although sometimes the official inquiry has found otherwise; and most of these failures have been, or will be, due to unsound competition in design between specialist designers cutting the steel or the concrete to the last ounce. Competition is quite right and sound between contractors quoting on a certain design, with certain quantities, and a hard and fast specification to which they can be kept, but competition in design often leads to undesirable results, and for this reason architects or their clients in localities where the L.C.C. Regulations are not enforced ought, in their own interest, to employ a consultant for the preparation of the design and the supervision of the work. In view of the good the L.C.C. Regulations on the whole have done in bringing about a healthy building practice, it is perhaps ungenerous to find fault with details, but there are one or two points where, in my opinion, they place reinforced concrete in a somewhat unfair position as compared with steel construction, and which I think and hope may be modified before long. One is the chapter dealing with columns. The requirements as they are now are directly responsible for the heavy columns which are such eyesores and space-wasters, and which are wasteful in material as well. The stresses allowed for rich mixtures could very well be increased, as, for instance, a mix of 1 : 1 : 2 should easily attain a crushing strength of 4,000 lbs. in 90 days, giving a working stress of 1,000 lbs. instead of 750 lbs. as allowed. Altogether, it would be better to work to a specified crushing strength than to a specified mixture, it being then up to the contractor to produce a concrete of a certain required strength. Where the column dimensions threaten to be excessive it pays to work with rich mixtures, even as the Regulations stand now, as not only does this reduce the scantlings of the column but also, in consequence, the amount of reinforcement required.

Another rule in connection with columns, also tending to produce bulky dimensions, is that dealing with the permissible load in relation to the length. Having fined down the working stress by the rules just mentioned, the regulations stop one from using this stress if the length of a square column 15 in. outside is more than 15 ft., with both ends absolutely fixed. It would be interesting to know what would become of all the pile piers and jetties erected here and elsewhere if this regulation were enforced; a 15 in. pile is a very usual member in a pier construction, but if it is more than 30 ft. long, unbraced, it is not supposed even to carry itself. I know of one or two piers where a 15-in. pile, considerably longer, is asked to do a good deal more than merely standing up, without getting credit for being supernatural. The rules for load in relation to length could, indeed, be relaxed somewhat without detriment to the safety of buildings, and if, in addition, the other points mentioned above were sympathetically considered we might expect to see columns a little more proportionate than at present.

With regard to the cost of a reinforced concrete building, there is only one point I would like to mention, where the Regulations have a direct bearing upon the cost of materials, viz., in the question of aggregate. At present this is required to be not larger than will pass the ¾ in. mesh in all cases. This regulation is, I believe, bred from the old tradition of designing beams with a crowd of bars, flat stirrups, &c., with hardly any room for the concrete at all. The ¾ in. stipulation was very necessary then, and as a safeguard against the tendency of steel-selling designers to give the reinforcement undue predominance over the concrete. I remember tendering for an arch bridge in the north some years ago, where I was informed by the engineer that my design did not stand much chance, having only three-quarters per cent. of steel, most of the others having much more, one even as much as 10 per cent. From a casual glance at the 10 per cent. design it would appear not only desirable but essential to use cement mortar only in its construction. In cases like this, which may still occur, the ¾ in. stipulation is undoubtedly good, but as the Regulations otherwise provide for ample cover and for generous spacing between the reinforcing bars there is room for some relaxation of this Rule. To fill a 24 in. column with ¾ in. aggregate is wicked waste of money, both for cement and aggregate, for everybody agrees, I believe, that, other conditions being equal, coarse aggregate, well graded, gives far better crushing results than does fine. I have found it difficult to improve upon ballast as it rises, provided care is taken that it is properly graded, and I have not the slightest hesitation in using stones up to 3 in. or 4 in. where the body of concrete warrants it; a certain amount of discretion is, of course, necessary in allowing this, but as long as the grading of the aggregate is perfect and the mixture not too stiff, there will always be enough fine stuff to flow round the reinforcing bars and cover them perfectly, if the foreman or ganger takes the trouble to see that it does.

The objection against reinforced concrete, that it does not readily allow for alterations afterwards, is perhaps more true than most others, but contains in itself an acknowledgment of the strength and durability of the material. The answer is obviously that there should not, in the ordinary way, be any need of alterations or cutting away, but that the building should be so thoroughly planned beforehand by the architect and the structural engineer as to require no amendments. This, of course, requires a little more forethought and care in allowing for holes, ducts and other provisions for cables, machinery, ventilation, &c., and if this contingency, being known, is provided for beforehand as one of the problems associated with the use of reinforced concrete this trouble need not occur.

It is to be hoped that the New Year will bring with it a greater impetus to the building trade generally, and the concrete frame building in particular, and I am convinced that if a sufficiently strong request is made in the right quarter, backed by a responsible body of builders or contractors, something might be done in the way of easing the Rules in the direction indicated here, with the result that reinforced concrete for frame buildings would stand a better chance and compel a more salient position than it does to present.

THE NATIONAL HOUSING POLICY.

By NORMAN McKELLEN

(Secretary of the National Federation of House Builders).

With the combination of the New Year and the new Government an impetus has been given to the discussion of the national housing policy which will certainly have to be formulated without delay. The position of the people as to housing grows steadily worse, and circumstances will force the Government to place it in the forefront of their New Year's programme. The whole subject bristles with difficulties, but, however hopeless it appears, the problem must be faced and solved, and the responsibility lies at the door of the Government to find a solution and to provide homes for the people.

The matter is not so formidable as it appears if it is approached from a business point of view, and if the many suggestions and recommendations are carefully sifted to eliminate those which arise from partisan sources. During the past ten years there has been an inundation of proposals from all sections of the people, from persons who are interested in housing because it has been their profession and their livelihood to persons whose interest is only philanthropic; and perhaps the most dangerous of all is that section whose policy is based on a desire to take advantage of the situation to conduct experiments in nationalisation.

Every available agency for the erection of good houses should be encouraged: the private builder, the public utility society, the local authority, and the Government should each take a share in the work; there is ample scope for them all in their own spheres, and their united efforts cannot satisfy the enormous demand for many years to come.

Under these circumstances the national policy should be framed in such a manner that the maximum output is obtained from every source and every agency should be encouraged to build good houses by all possible means. The great failure of the housing policy of the late Government was that it encouraged one avenue of supply—municipal enterprise—and by the means adopted it prevented another and an infinitely greater agency — private enterprise — from taking part in the work. Whether it was done wilfully or not is immaterial now, except as an example of what to avoid in the future; but in effect the recent housing effort was a disastrous and expensive experiment in socialism. It is to be hoped that in the new policy which the Government will have to adopt due regard will be given to the effect of any assistance which is granted to one source of supply upon other sources. If, for instance, a State subsidy is given exclusively to local authorities, the houses which they build can be let at lower rents or sold at lower prices than the private builder can let or sell without the subsidy. The natural consequence will be to prevent private enterprise from building at all, and the most prolific source of supply will continue closed.

The suggestions which the National Housing and Town-Planning Council is to consider early in the New Year, and which were outlined recently in *The Builder*, appear to be largely a renewal of the old policy with a different method of subsidy to local authorities; they have all the disadvantages of the old system in that there is no room for the private builder—the experiment in nationalisation is to be continued. Notwithstanding the fact that private enterprise provided practically all the houses for the working classes in the past, there is no proposal by the National Housing and Town-Planning Council to revive it. The whole basis of housing is to be changed, and the people must wait for their houses until the new order of communistic supply is working efficiently. For the past four years the new principle has been on trial and it has resulted in a staggering financial loss, but has not succeeded in producing enough houses even to supply the needs of the growing population—the shortage is greater than it was when the new order was put on trial. Even with this gigantic failure before its eyes the Council puts forward proposals which contain nothing new; it has apparently learned nothing from the experiment, and it advocates a policy which will only repeat the experience of the past four years. If there had been any expression of opinion or any suggestion towards the necessity for developing private enterprise in housing it would have appeared that the Council realised the necessity for obtaining houses quickly, but it confines its policy to the one narrow view that the local authority, with a little assistance from public utility societies, is the only agency to be encouraged. With all possible good will, and this is the season for good will, one is drawn to the conclusion that the policy of the Council is dictated by a strong partisan bias.

The position of the building trade, the continued high cost of materials and labour, and the restricted basis of rents, make it necessary for some Government action to be taken. Until houses can be built to let at a rent which will show an economic return on the cost very few houses will be built without some form of assistance from national funds. The assistance, whatever form it takes, will be in effect a contribution towards the inevitable loss, and whether it is given to local authorities or private persons no one will benefit except the tenant who obtains a house. The assistance should be granted equally to all agencies, whether public or private. This does not benefit the builder except that it enables him to resume his occupation, for the reduced cost will induce purchasers once more to buy houses. When the investor looks with favour on bricks and mortar, and they are still the best investment in the country, the housing problem will soon cease to be a menace to the health of the nation. With equal assistance for all agencies the private builder could build, the public utility society could operate on sound lines, and the local authority could provide houses for the clearance of slum areas without too heavy a call on the already high rates.

The assistance might take one or more of several forms. The National Housing and Town-Planning Council advocates three forms: a yearly grant of a fixed sum per house; the grant of a definite sum, being a contribution towards the capital loss; and the loan of capital at a low rate of interest. The National Federation of House Builders, which is also putting forward proposals for a national housing programme, asks for the grant of a cash subsidy to the owner of all new houses of an approved type for the working classes. Both the Federation and the National Housing and Town-Planning Council mention as an alternative method of assistance the exemption of new houses from local rates for a period of years. The Council does so in a distinctly cold manner, for this idea is essentially one to encourage private ownership, but the Federation of House Builders is of opinion that this is a promising method. It is pointed out by the Federation that the amount of extra burden thrown on the existing ratepayers by the exemption of new houses from local rates would be small in certain districts, and could be entirely defrayed by a yearly grant to the local authority from national sources.

Thus we see that both the organisations are at one in their ideas of Government assistance, but they part company when they consider who is to receive the grant. The Council suggests that only local authorities should be helped, and the National Federation of House Builders asks that the assistance "should be granted equally to municipalities and to private enterprise building houses of a good type." Assuming that the effect of the assistance is to reduce the cost to an economic level, and not to provide an extra-legitimate profit to the builder, there seems no reason why a builder, if he erect a hundred houses for sale to investors, should not have the assistance equally with the local authority which also erects a hundred houses. If this assistance is given equally the private builder will build many more houses than the local authority, and will build equally suitable ones for the district. If it be argued that he will make an illegitimate profit out of the subsidy I can only point to the fact that unless the grant is carefully safeguarded the liability to have it exploited by the workman, the manufacturer and the builder exists just as much in local authorities' schemes as in private enterprise; this was amply proved by the experiment of the past four years.

In our national housing programme we want a broad-minded business-like policy; everyone with experience in the subject should contribute to the settlement of the policy, for the need for houses is very great. It does not help matters to approach the question from a partisan basis. There is work for every kind of good builder, and we should try to get them all building.

The National Federation of House Builders in its suggested national housing programme states, in part: "The first step towards a resumption of building must be to restore the confidence of investors in house property, and this can only be done when house property is free from the heavy restrictions which are now imposed by the Rent Restriction Act. The withdrawal of the Act would not lead to unduly high rents, for the resumption of buying by the public would cause activity in building, and the free competition would rapidly restore an economic position of rents and costs. The Rent Restriction Act intensifies the housing shortage. Every endeavour should be made to encourage the people to invest their savings once more in house property. All local authorities which build houses in the future should be compelled to charge economic rents except for the clearing of slum areas. If any State assistance is granted for housing it should be granted equally to municipalities and to private enterprise building houses of a good type. Some form of assistance is necessary to build houses for the working classes, and in the opinion of the Federation the most efficient and economical method of affording the necessary assistance is by a cash subsidy to the owner of all new houses of an approved type. An alternative method in some districts might be found by the exemption of new houses from local rates for a period of years. Every method of encouraging the citizen to purchase his own house should be examined and adopted if it promises to add to the available housing accommodation. Local authorities should revise their by-laws in order to cheapen the cost of building and roadmaking so that houses can be let or sold at a reasonable figure. Local authorities should be empowered to lend money on mortgage to responsible builders developing estates and erecting houses of approved types. Prompt and decided action should be taken by the Government to counteract the operations of the trusts and combines in building materials."

DESIGN OF REINFORCED CONCRETE MEMBERS FOR BENDING COMBINED WITH THRUST OR TENSION.*

BY OSCAR FABER, O.B.E., D.Sc.

MEMBERS subject to bending combined with thrust include arches, many members in trusses, and nearly all pillars, columns, piles, &c., which are, as a rule, more or less eccentrically loaded.

Members subject to bending combined with tension include silo walls and many members in trusses.

This is sufficient evidence that the subject is an important one. In reinforced concrete it is also a difficult one, and in the author's opinion has so far been inadequately treated.

In his "Reinforced Concrete Design," Volume 1, written with the collaboration of Mr. P. G. Bowie, the subject was treated in Chapter III. Perhaps after ten years it is not surprising that the author has groped his way to a fuller and more helpful treatment.

In his present view, the original treatment suffered from two defects:—

1. That the position of the resultant thrust or tension was assumed to be known. It is in some cases, but not in all. When, for example, the moment M and the direct force P are given (quite a common case), then the eccentricity

$$e = \frac{M}{P} \text{ is determined.}$$

but, until the centroid is calculated, neither $e-f$ nor $e+f$ are known. No method of calculating f was suggested, and yet $e-f$ and $e+f$ were the basis of the treatment given. The importance of this will be grasped when it is mentioned that f may vary from o to d, and may be large compared with e.

2. No ready method of selecting a suitable section in a given case were given, all that was offered being a method of calculating stresses in sections chosen more or less at random. The treatment now offered remedies these defects, and tends, it is hoped, to a clearer understanding of the subject and a much readier solution of problems.

The subject is conveniently separated into bending and tension, and bending and compression.

The article limits itself to the design or analysis of cases when the moment and forces are known, the calculation of these being outside its scope.

The following notation is used:—

a = radius arm, distance from centre of tension to centre of compression.

$a_1 = \frac{a}{d}$

b = breadth.

d = depth, measured to the tensile reinforcement.

n = depth of the neutral axis.

$n_1 = \frac{n}{d}$

m = modular ratio = $\frac{\text{elastic modulus of steel}}{\text{elastic modulus of concrete}} = 15$

g = depth of the centroid or centre of gravity. In its calculation, the concrete in tension is ignored, and steel is replaced by m times its area of concrete.

$g_1 = \frac{g}{d}$

f = distance of centroid from tensile reinforcement.

$f_1 = \frac{f}{d}$

t = tensile stress (generally in tensile reinforcement).

c = compressive stress (generally in concrete).

t_1 = ratio of stresses $\frac{t}{c}$

r = ratio of steel to concrete = $\frac{A}{bd}$

M = moment.

P = direct thrust or tension.

T = total tension in tensile reinforcement.

C = total impression.

A = area of steel reinforcement.

Forces are in lbs., lengths in inches, stresses in lbs. per square inch.

In the following treatment, the assumptions are made:—

(1) The resistance of concrete to tension is ignored.

(2) The modular ratio is taken as constant and equal to 15.

(3) Plane sections are taken as remaining plane after bending.

BENDING AND TENSION.

Case I: WHERE BOTH SIDES ARE IN TENSION.

This occurs when the resultant P lies inside the limits of d and only members reinforced on both sides are suitable for such loading.

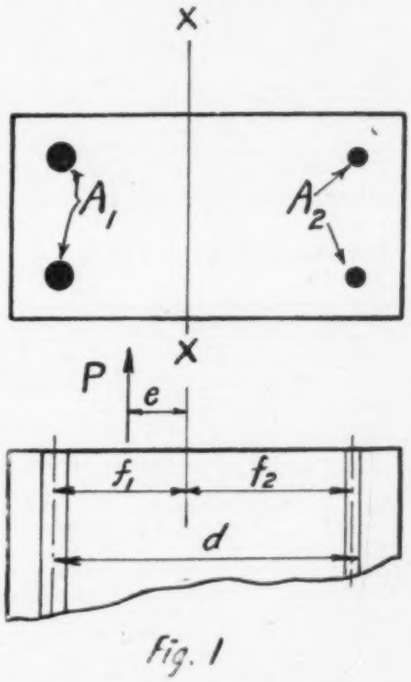


Fig. 1

In the following formulæ, the tension is assumed to be taken up entirely by the steel alone.

Let stress in $A_1 = t_1$

" " " $A_2 = t_2$

The centroid XX is determined by:—

$$f_1 = \frac{A_2 d}{A_1 + A_2} \quad \text{——— 1}$$

$$f_2 = \frac{A_1 d}{A_1 + A_2} \quad \text{——— 2}$$

and if e is the eccentricity about the centroid, then:—

$$t_1 = \frac{P}{A_1}\frac{e+f_2}{d} \quad \text{——— 3}$$

$$t_2 = \frac{P}{A_2}\frac{f_1-e}{d} \quad \text{——— 4}$$

EXAMPLE 1: $A_1 = 6$ in.^{2}
$A_2 = 3$ in.^{2}
$d = 10$ in.
Moment $M = 100{,}000$ in. lb.
$T = 50{,}000$ lb.
Calculate t_1 and t_2.

Solution:

$$e = \frac{M}{T} = \frac{100{,}000}{50{,}000} = 2 \text{ in.}$$

$$f_1 = \frac{A_2 d}{A_1 \times A_2} \text{ (from (1))} = \frac{3 \times 10}{9} = 3\tfrac{1}{3} \text{ in.}$$

$f_2 = 6\tfrac{2}{3}$ in.

t_1 (from (3)) $= \frac{50{,}000}{6} \times \frac{2+6\frac{2}{3}}{10} = 7{,}200$ lb./in.^{2}

t_2 (from (4)) $= \frac{50{,}000}{3} \times \frac{3\frac{1}{3}-2}{10} = 2{,}222$ lb./in.^{2}

EXAMPLE 2: If $d = 10$ in.
$T = 50{,}000$ lb.
line of tension is 2 in. inside A_1.

Calculate A_1 and A_2 to give a stress of 16,000 lb./in.^{2} in both cases.

Solution:

$e + f_2 = d - 2$ in. $= 8$ in.

$$\therefore A_1 = \frac{P}{t_1} \times \frac{e+f_2}{d} \text{ from (3)} = \frac{50{,}000}{16{,}000} \times \frac{8}{10} = 2{\cdot}5 \text{ in.}^2$$

$$A_2 = \frac{50{,}000}{16{,}000} \times \frac{2}{10} = {\cdot}625 \text{ in.}^2$$

EXAMPLE 3: $d = 10$ in.
$M = 100{,}000$ in. lb.
$P = 50{,}000$ lb.

It is required to design A_1 and A_2, so that the stress shall be 16,000 lb. in.^{2} in them both.

Clearly $e = \frac{M}{P} = \frac{100{,}000}{50{,}000} = 2$ in.

Solution:

There is no solution to this question, or any similar one in which it is required to resist a moment with the same stress on both sides.

From (1) & (2) $\frac{f_1}{f_2} = \frac{A_2}{A_1}$ whence $f_1 = f_2 \cdot \frac{A_2}{A_1}$

Since $t_1 = t_2$ $\frac{P}{A_1}\frac{e+f_2}{d} = \frac{P}{A_2}\frac{f_2-e}{d}$

whence $\frac{e+f_2}{A_1} = \frac{f_1-e}{A_2}$

Substitute $f_1 = f_2 \frac{A_2}{A_1}$

$$\frac{e+f_2}{A_1} = \frac{f_2\frac{A_2}{A_1}-e}{A_2}$$

Multiply across

$$e A_2 + f_2 A_2 = f_2 A_2 - e A_1$$

$$e(A_1 + A_2) = o$$

Since $(A_1 + A_2)$ cannot $= o$

$$e = o$$

In other words, there can be no eccentricity about the centroid when the stresses are equal, the centroid automatically adjusts itself then to the line of resultant tension.

CASE II: WHEN THE MEMBER IS SUBJECT TO COMPRESSIVE STRESS ON ONE SIDE AND TENSILE STRESS ON THE OTHER—MEMBERS SINGLY REINFORCED—ECCENTRICITIES UP TO 1·6d.

In Fig. 2 is shown a singly reinforced member subject to a tensile force P acting with an eccentricity e about the centroid X X, and producing a tensile stress t in the steel and a maximum compressive stress c in the concrete. The depth of the neutral axis (the line of no stress or strain) is n from the compressed edge, the depth of the centroid from the same point is g.

The distance of the steel from the centroid to the steel is f, while b and d are the breadth and

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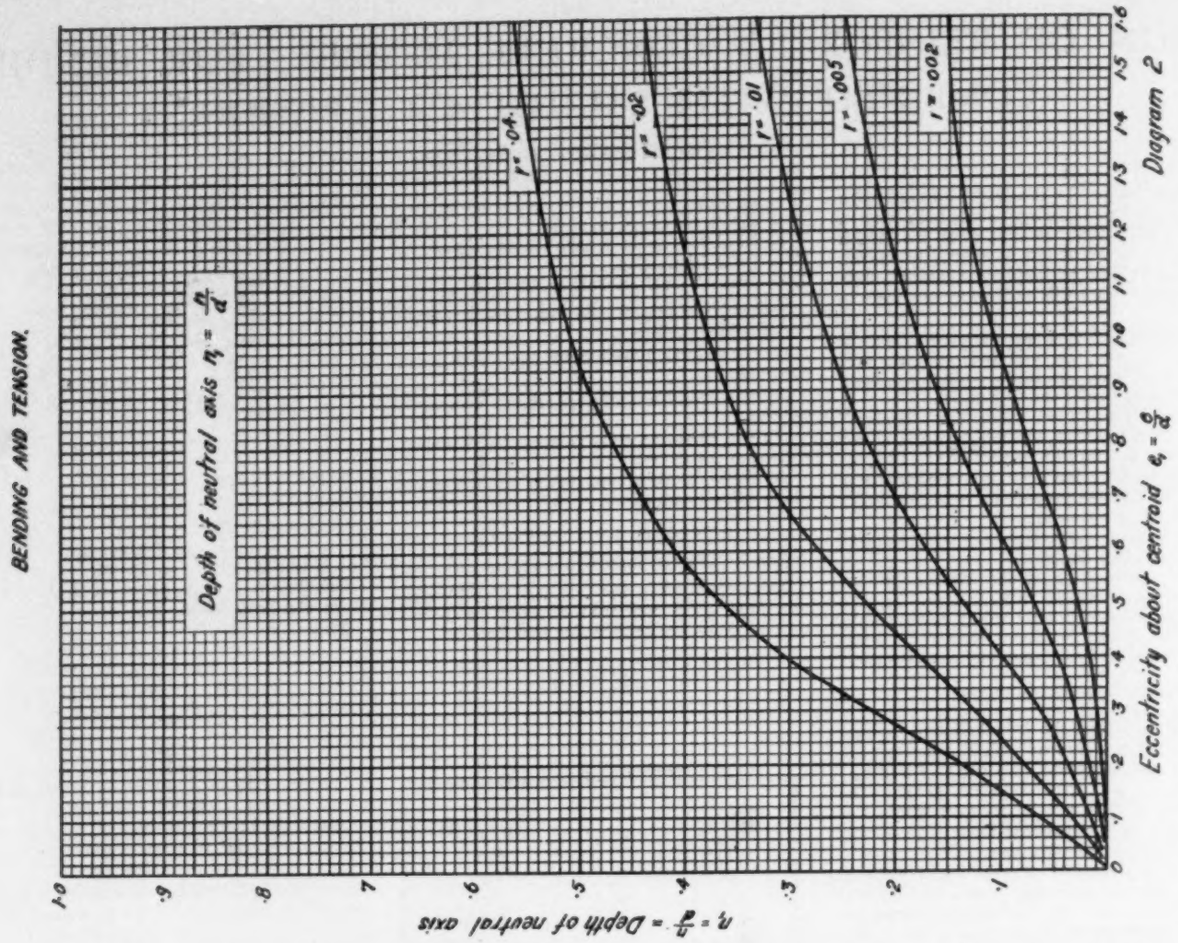
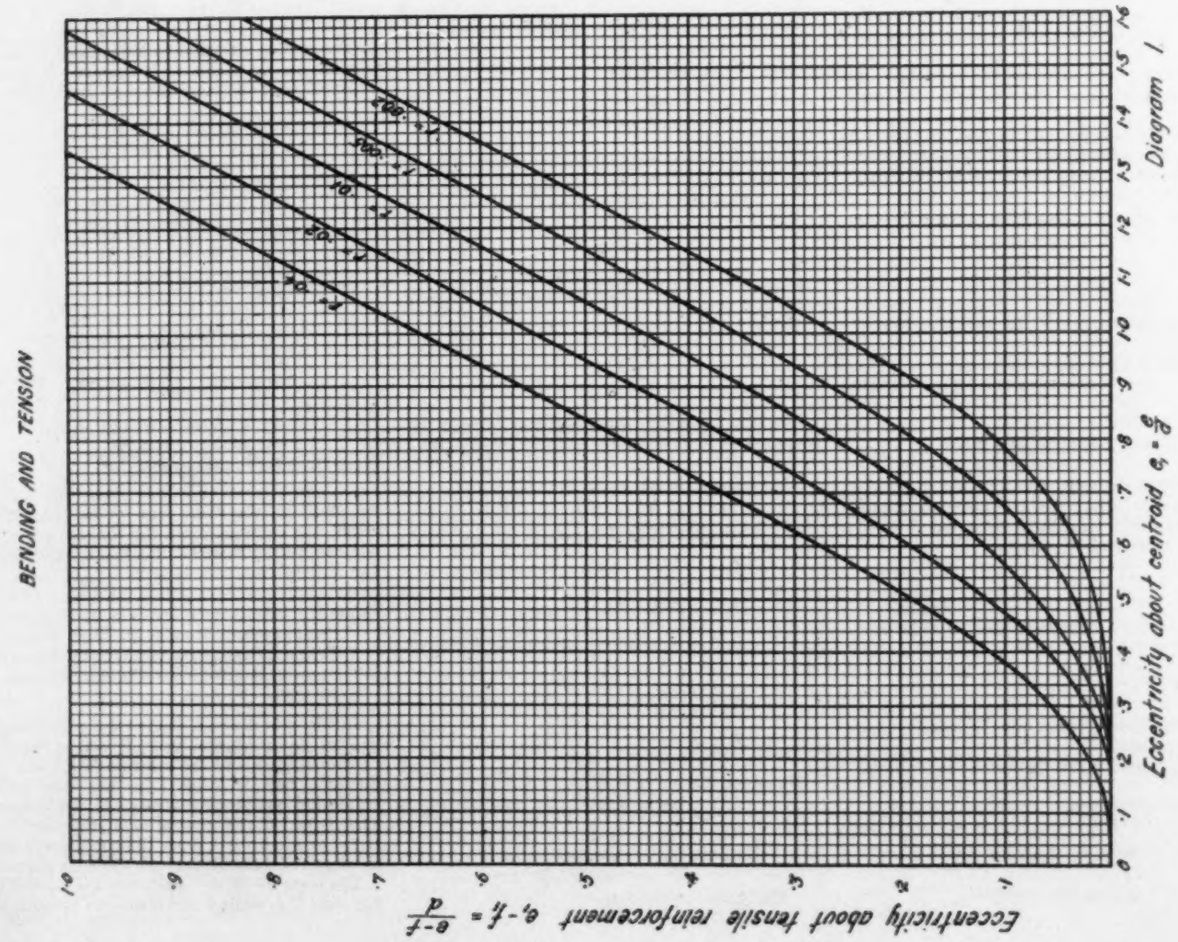

BENDING AND TENSION.
Depth of neutral axis $\eta = \frac{n}{d}$
r = .04
r = .02
r = .01
r = .005
r = .002
$\eta = \frac{n}{d}$ = Depth of neutral axis
Eccentricity about centroid $e = \frac{e'}{d}$
Diagram 2


BENDING AND TENSION
p = .01
p = .008
p = .006
p = .004
p = .002
Eccentricity about tensile reinforcement $e - f = \frac{e - f}{d}$
Eccentricity about centroid $e = \frac{e'}{d}$
Diagram 1

depth of the member, the latter being, as usual, measured only to the steel from the compressed edge.

Now to start off with a given section and a given P and e and determine the remaining quantities involves very great difficulties, owing to the fact that the centroid (from which e is to be measured) cannot be determined until the neutral axis is known.

In the following treatment I have therefore tackled the subject from the back, as it were, assumed n and r the ratio of steel $\frac{As}{bd}$ which enables me to calculate $t_1 = \frac{t}{c}$, g, and f, and then to calculate what values of P and e are required to produce this condition of stress. The curves obtained from these calculations may, of course, in practice be used the other way, to determine the stresses from given values of T and e.

Given $n_1 = \frac{n}{d}$

and $r = \frac{As}{bd}$

the remaining quantities may be calculated as follows:—

$$\text{Rates of stresses: } t_1 = \frac{t}{c} = \frac{m(1-n_1)}{n_1} \qquad \text{——1}$$

(See "R. C. D.," Volume I. m is the modular ratio.)

To obtain g, the depth of the centroid, take moments of the areas about the compressed edge. The equivalent steel area is m A and its moment about the compressed edge is m A d. The area of concrete in compression is bn and its moment about the compressed edge is $bn \times \frac{n}{2}$. Hence g (which is the sum of the moments divided by the sum of the areas)

$$g = \frac{mAd + bn \times \frac{n}{2}}{mA + bn}$$

Substituting $A = rbd$ and dividing top and bottom by b, this reduces to

$$g = d\left(\frac{mr + \frac{n_1^2}{2}}{mr + n_1}\right)$$

or

$$g_1 = \frac{g}{d} = \frac{mr + \frac{n_1^2}{2}}{mr + n_1} \qquad \text{——2}$$

f can then be obtained as follows:—

$$f = d - g$$

$$= d - d\left(\frac{mr + \frac{n_1^2}{2}}{mr + n_1}\right)$$

$$= d\left(\frac{mr + n_1 - mr - \frac{n_1^2}{2}}{mr + n_1}\right)$$

$$= d\left(\frac{n\left(1 - \frac{n_1}{2}\right)}{mr + n}\right)$$

$$\text{or } f_1 = \frac{f}{d} = \frac{n\left(1 - \frac{n_1}{2}\right)}{mr + n} \qquad \text{——3}$$

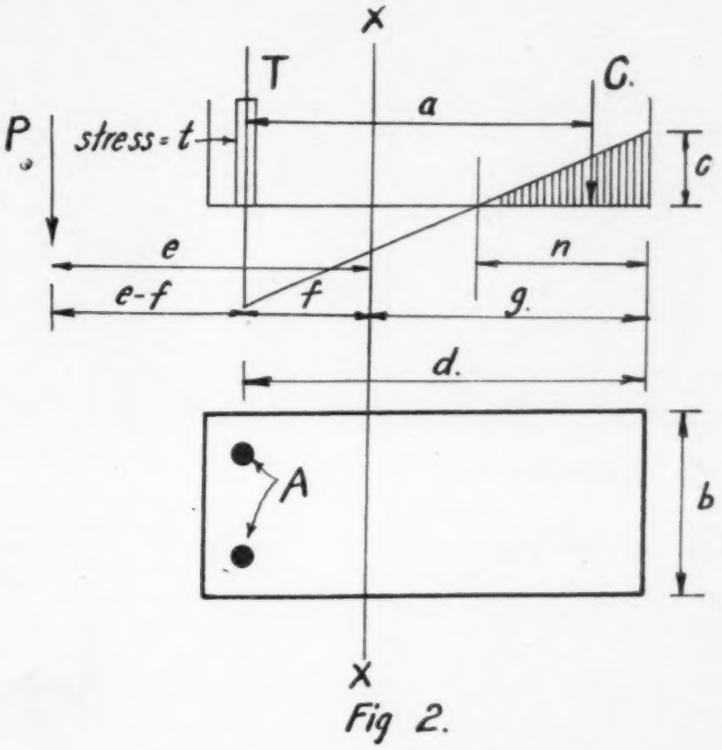


Fig 2.

Coming now to the determination of the remaining quantities, the forces and distances can be represented as in Fig. 2. T and C represent the resultants of the internal tensile and compressive forces. The distance a (the radius arm) is at once determined by n, as usual.

$$a_1 = \frac{a}{d} = 1 - \frac{n_1}{3} \qquad \text{——4}$$

Since the moments about C must balance,

$$P(e - f + a) = T\,a$$

Substituting $T = t\,A$ where t is the tensile stress and A the area of tensile reinforcement.

$$P(e - f + a) = t\,A\,a$$

$$\text{whence } t = \frac{P}{A}\,\frac{e - f + a}{a} \qquad \text{——5}$$

Taking moments about T

$$P(e - f) = C\,a$$

$$= \frac{c\,b\,n\,a}{2} \qquad \text{——6}$$

$$\text{whence } c = \frac{2P(e-f)}{b\,n\,a}$$

from (5) and (6)

$$t_1 = \frac{t}{c} = \frac{(e - f + a)\,bn}{2A(e - f)}$$

Substitute $A = r\,b\,d$

$$t_1 = \frac{(e - f + a)\,n}{2r\,d\,(e - f)}$$

$$= \frac{(e - f + a)\,n_1}{2r(e - f)}$$

whence:

$$(e - f)\,2r\,t_1 = (e - f)\,n_1 + a\,n_1$$

$$(e - f)(2r\,t_1 - n_1) = a\,n_1$$

$$e - f = \frac{a\,n_1}{2r\,t_1 + n_1}$$

$$\frac{e - f}{d} = s_1 - f_1 = \frac{a_1 n_1}{2r\,t_1 + n_1} \qquad \text{——7}$$

It now only remains to express the stresses in terms of P and $b\,d$. This may be done as follows. Referring back to Fig. 2, it is clear that the sum of the downward forces must balance the upward force, so that

$$P = T - C$$

whence

$$\frac{P}{bd} = \frac{T}{bd} - \frac{C}{bd}$$

Substituting $T = r\,bdt$

and $C = \frac{n\,b\,c}{2} = \frac{n_1\,b\,d\,c}{2}$

$$\frac{P}{bd} = \frac{r\,b\,d\,t}{bd} - \frac{n_1\,b\,d\,\frac{c}{a}}{bd}$$

$$= rt - \frac{n_1 c}{2}$$

$$= rt - \frac{n_1}{2}\,\frac{t}{t_1} \text{ since } t_1 = \frac{t}{c}$$

$$= t\left(r - \frac{n_1}{2t_1}\right)$$

whence

$$\frac{t\,bd}{P} = \frac{t_1}{rt_1 - \frac{n_1}{2}} \qquad \text{——8}$$

and

$$\frac{c\,b\,d}{P} = \frac{t}{t_1}\,\frac{bd}{P}$$

$$= \frac{1}{t_1}\,\frac{t_1}{rt_1 - \frac{n_1 r}{a}}$$

$$= \frac{1}{rt_1 - \frac{n_1 r}{a}} \qquad \text{——9}$$

From these equations, it is therefore easy to calculate all the quantities corresponding to an assumed value for r (the steel ratio), and n_1 (the depth of neutral axis). Perhaps an example will be worth while.

Take the case of 1 per cent. steel (r = ·01) and $n_1 = \frac{n}{d} = \cdot 3$.

Then

$$a_1 = 1 - \frac{n_1}{3} \text{ (Eqn. 4)}$$

$$= \cdot 9$$

$$g_1 = \frac{mr + \frac{n_1^2}{2}}{mr + n_1} \text{ (Eqn. 2)}$$

$$= \frac{\cdot 15 + \cdot 045}{\cdot 45} = \cdot 4325$$

$$f_1 = 1 - g_1 = \cdot 5675$$

$$t_1 = \frac{m(1 - n_1)}{n_1} \text{ (Eqn. 1)}$$

$$= \frac{15 \times \cdot 7}{\cdot 3} = 35$$

From (Eqn. 7)

$$(e - f) = \frac{a_1 n_1}{2rt_1 - n_1} = \frac{\cdot 9 \times \cdot 3}{\cdot 02 \times 35 - \cdot 3} = \frac{\cdot 27}{\cdot 4} = \cdot 675$$

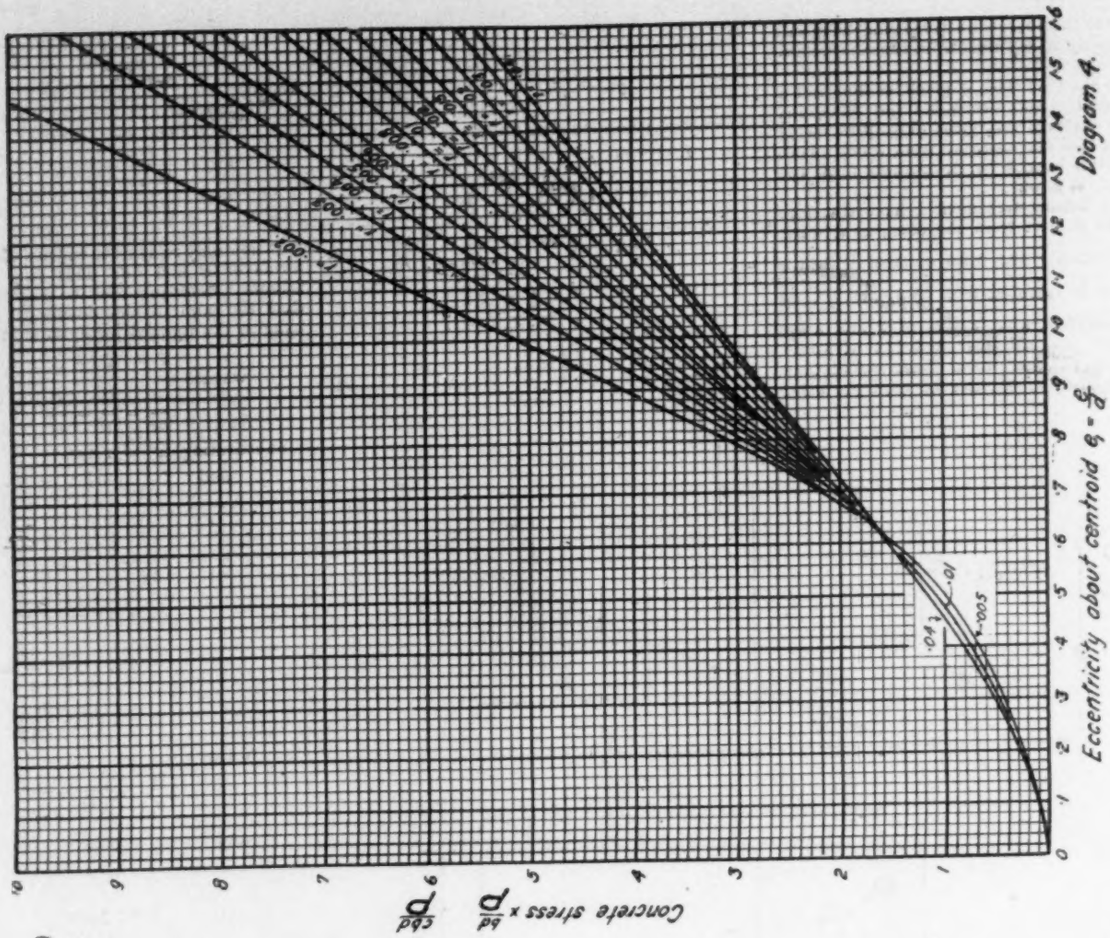
$$\therefore e_1 = (e_1 - f_1) + f_1 = \cdot 675 + \cdot 5675 = 1 \cdot 2425$$

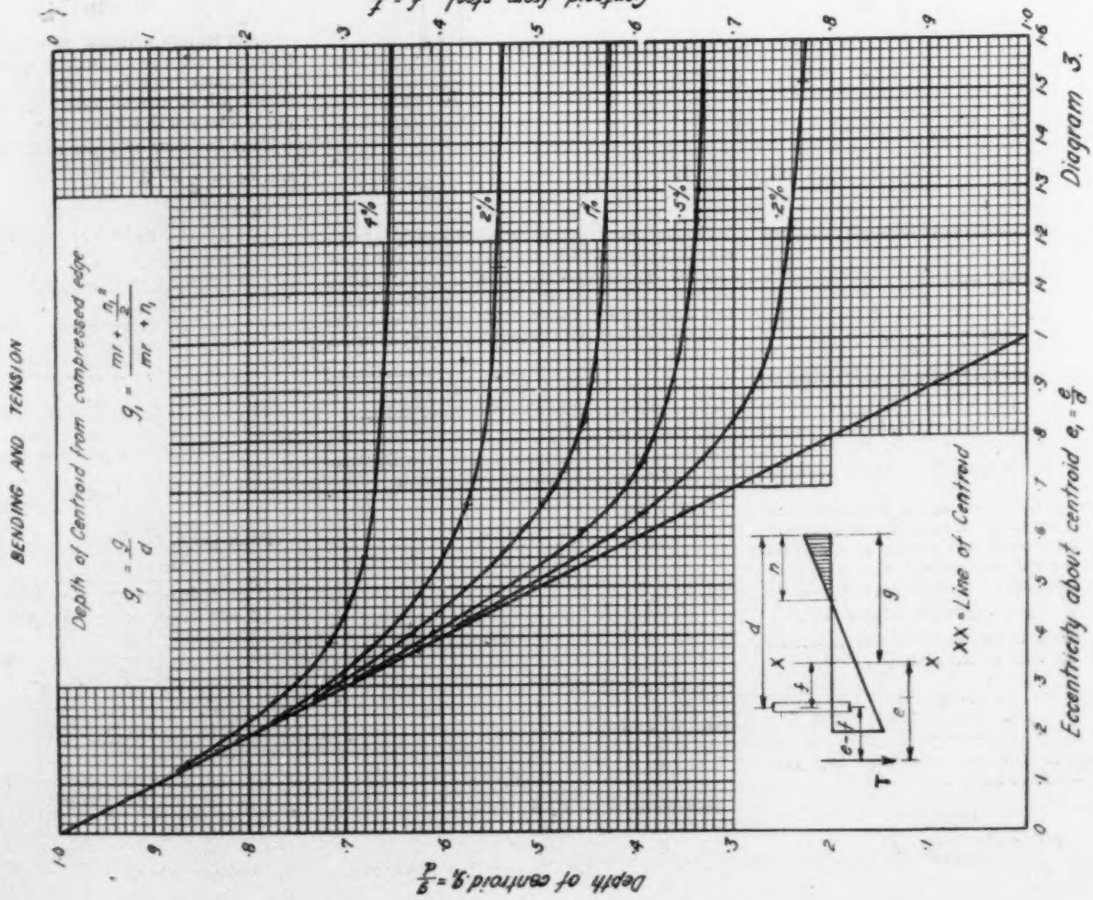
$$\frac{t\,bd}{P} = \frac{t_1}{rt_1 - \frac{n_1}{2}} \text{ (Eqn. 8)}$$

$$= \frac{35}{\cdot 35 - \cdot 15} = \frac{35}{\cdot 2} = 175$$

$$\frac{c\,bd}{P} = \frac{1}{rt_1 - \frac{n_1}{2}} \text{ (Eqn. 9)}$$

$$= \frac{1}{\cdot 35 - \cdot 15} = \frac{1}{\cdot 2} = 5$$


BENDING AND TENSION.
Concrete stress × bd/P cbd/P
Eccentricity about centroid e₁ = e/d
Diagram 4.


BENDING AND TENSION
Centroid from steel f₁ = f/d
Depth of centroid g₁ = g/d
Eccentricity about centroid e₁ = e/d
Diagram 3.
Depth of Centroid from compressed edge
g₁ = x/d
g₁ = (m/2 + n₁²/2) / (m + n₁)
4%
2½%
1%
·5%
·2%
XX = Line of Centroid
T

These calculations give us a point on one curve on each of diagrams 1 to 6. It will be understood that to produce many points on many curves requires a good deal of spade work, but only by this means could the curves be drawn. The results are here recorded for future reference in tabular form:

EXAMPLE 1:
A reinforced beam
having $d = 10$ in.
$b = 6$ in.
$A = \cdot614$ in.
is subject to a tension of 6,000 lb. and a moment of 60,000 in. lb.

TABLE I.

BENDING AND TENSION.

Steel Ratio.	Depth of Neutral Axis. n	Radius Arm. a_1	Depth of Centroid g_1	Centroid from Steel. f_1	Eccentr. about Steel $e - f$	Eccentr. about Centroid e_1	Ratio of Stresses. $\frac{c}{t} = \frac{1}{t_1}$	Steel Stress $\times \frac{bd}{P}$ $\frac{t\,b\,d}{P}$	Concrete Stress $\times \frac{bd}{P}$ $\frac{c\,b\,d}{P}$
·002 ..	·15	·95	·23	·77	·749	1·519	·01175	895	10·5
	·1	·96$\dot{6}$	·27	·73	·219	·949	·0074	614	4·55
	·05	·98$\dot{3}$	·392	·608	·044	·652	·00351	523	1·83
·005 ..	·2	·9$\dot{3}$	·345	·655	·46$\dot{5}$	1·122	·01$\dot{6}$	300	5
	·1	·96$\dot{6}$	·457	·543	·072	.615	·0074	216.$\dot{6}$	1.6
	·05	·98$\dot{3}$	·61	·39	·0175	·4075	·00351	201	·704
·01 ..	·3	·9	·4325	·5675	·675	1·2425	·028$\dot{6}$	175	5
	·2	·9$\dot{3}$	·485	·515	·18$\dot{3}$	·7016	·01$\dot{6}$	120	2
	·1	·96$\dot{6}$	·6345	·3655	·037	·4025	·0074	104	·769
·02 ..	·4	·8$\dot{6}$	·5429	·4571	·69$\dot{3}$	1·15	·0445	90	4
	·3	·9	·575	·425	·2455	·6705	·028$\dot{6}$	63·6	1·82
	·2	·9$\dot{3}$	·64	·36	·085	·445	·01$\dot{6}$	54·5	·91
	·1	·96$\dot{6}$	·7625	·2375	·0182	·2457	·0074	50.9	·377
·04 ..	·55	·81$\dot{6}$	·653	·347	1·035	1·382	·081$\dot{3}$	56·5	4·625
	·5	·8$\dot{3}$	·659	·341	·595	·936	·06$\dot{6}$	42·8	2·86
	·4	·8$\dot{6}$	·68	·32	·247	·567	·0445	32·1	1·43
	·3	·9	·717	·283	·108	·391	·028$\dot{6}$	28	·8
	·2	·9$\dot{3}$	·775	·225	·045	·27	·01$\dot{6}$	26·1	·435
	·1	·96$\dot{6}$	·864	·136	·009	·145	·0074	25·3	·187

Diagrams 1 to 6 set these results out in the form of curves which will be found of great convenience in design, but which also bring out some very interesting facts. When there is no eccentricity, the member is clearly subject to pure tension, and the steel is the centroid.

Diagram 1 shows how, when a slight eccentricity occurs, the centroid moves rapidly away from the steel. Thus, when the external tension moves from the steel to a point ·1 *d* outside it, the centroid moves a distance of ·68 *d* the other way (with a steel percentage of ·2) making the actual eccentricity ·78 *d*. This effect is most marked for small eccentricities.

A comparison of Diagrams 3 and 4 shows how the neutral axis and the centroid, starting from the tensile and compressive edges respectively with $e_1 = o$, gradually approach one another, and coincide when e_1 becomes great.

Diagram 4 brings out the interesting fact that at an eccentricity of about ·62 *d*, the concrete stress is independent of the steel percentage. It must be remembered, however, that this eccentricity of ·62 *d* from the centroid corresponds to very different eccentricities from the steel reinforcement, as will be seen by reference to Diagram 1, which gives the corresponding eccentricities from the steel as varying from ·29 *d* for 4 per cent. steel, to ·036 *d* for ·2 per cent. steel.

Diagram 5 shows that for small eccentricities up to about ·4 *d* the steel stress is almost unaffected.

Diagram 6 shows that the ratio of stresses $\frac{c}{t}$ increases from *o* with no eccentricity and ultimately with increasing eccentricity the curves become asymptotic to the ratio of stresses corresponding to the particular percentage of steel in pure bending.

A few examples of the use of the curves will now be given.

The steel ratio is

$$r = \frac{2 \times \cdot307}{10 \times 6} = \cdot0102$$

and the eccentricity is

$$e = \frac{M}{P} = \frac{60{,}000}{6{,}000} = 10 \text{ in.}$$

whence

$$e_1 = \frac{e}{d} = \frac{10}{10} = 1$$

Hence from Diagram 5

$$\frac{tbd}{P} = 145$$

and the tensile stress

$$t = 145 \frac{P}{bd} = 145 \times \frac{6{,}000}{6 \times 10} = 14{,}520 \text{ lb./in.}^2.$$

From Diagram 4

$$\frac{cbd}{P} = 3{\cdot}64$$

Whence the concrete stress

$$c = 3{\cdot}64 \times \frac{P}{bd} = 3{\cdot}64 \times \frac{6{,}000}{6 \times 10} = 363 \text{ lb./in.}^2.$$

If the other quantities are of interest,
n (from Diagram 2) = 2·66 in.
g (from Diagram 3) = 4·4 in.
f = 5·0 in.
Eccentricity from steel $e - f = 10 - 5{\cdot}0 = 4{\cdot}4$ in.

When it comes to design, the curves so far referred to can only be used by a tedious process of trial.

Diagram 7 has been prepared to enable a section to be calculated direct.

Its derivation is as follows:—

From Diagram 4 we have values for $\frac{cbd}{P}$.

Now

$$\frac{c}{\frac{cbd}{P}} = \frac{P}{bd}$$

So that if we divide a safe concrete stress (such as 600 lb./in.²) by the values $\frac{cbd}{P}$ given in Diagram 4, we obtain a safe value of $\frac{P}{bd}$ in which c will be 600.

Similarly, if we divide a safe tensile stress t (such as 16,000 lb./in.²) by the values of $\frac{tbd}{P}$ given in Diagram 5, we obtain a safe value of $\frac{P}{bd}$ in which t will be 16,000.

In this way we obtain two values for $\frac{P}{bd}$ for a given steel ratio and eccentricity, one of which limits the concrete stress to 600 and the other limits the steel stress to 16,000.

By selecting the lower value, we ensure that *neither* the safe compressive nor tensile stresses will be exceeded.

Thus, for $r = \cdot01$ and $e = 12{,}425$ we have from Table I (or Diagram 4)

$$\frac{cbd}{P} = 5.$$

$$\frac{P}{bd} = \frac{c}{\frac{cbd}{P}} = \frac{600}{5} = 120$$

when $c = 600$.

Similarly

$$\frac{tbd}{P} = 175$$

$$\therefore \frac{P}{bd} = \frac{t}{\frac{tbd}{P}} = \frac{16{,}000}{175} = 91{\cdot}5$$

when $t = 16{,}000$.

Hence, if we take $\frac{P}{bd} = 91{\cdot}5$ we shall have a steel stress = 16,000 and a concrete stress under 600.

In this way the values in Table II and Diagram 7 have been prepared and are here recorded. It should be noted that in the Table the higher (and therefore unrequired) figures are not recorded.

TABLE II.—BENDING AND TENSION.

Safe values of $\frac{P}{bd}$ for limiting stresses of
$c = 600$
$t = 16{,}000$

TABLE II.

$r = \cdot002$			$r = \cdot005$			$r = \cdot01$			$r = \cdot02$			$r = \cdot04$		
e_1	$t = 16{,}000$	$c = 600$	e_1	$t = 16{,}000$	$c = 600$	e_1	$t = 16{,}000$	$c = 600$	e_1	$t = 16{,}000$	$c = 600$	e_1	$t = 16{,}000$	$c = 600$
1·519	17·9		1·122	53·3		1·2425	91·5		1·15		150	1·382		129·5
												·936		210
·949	26·1		·615	74		·7016	133·3		·6705	252		·567		420
												·391	572	
·652	30·6		·407	79·6		·4025	154		·445	294		·27	614	
												·145	633	
						0	160		·2457	315		0	640	
									0	320				

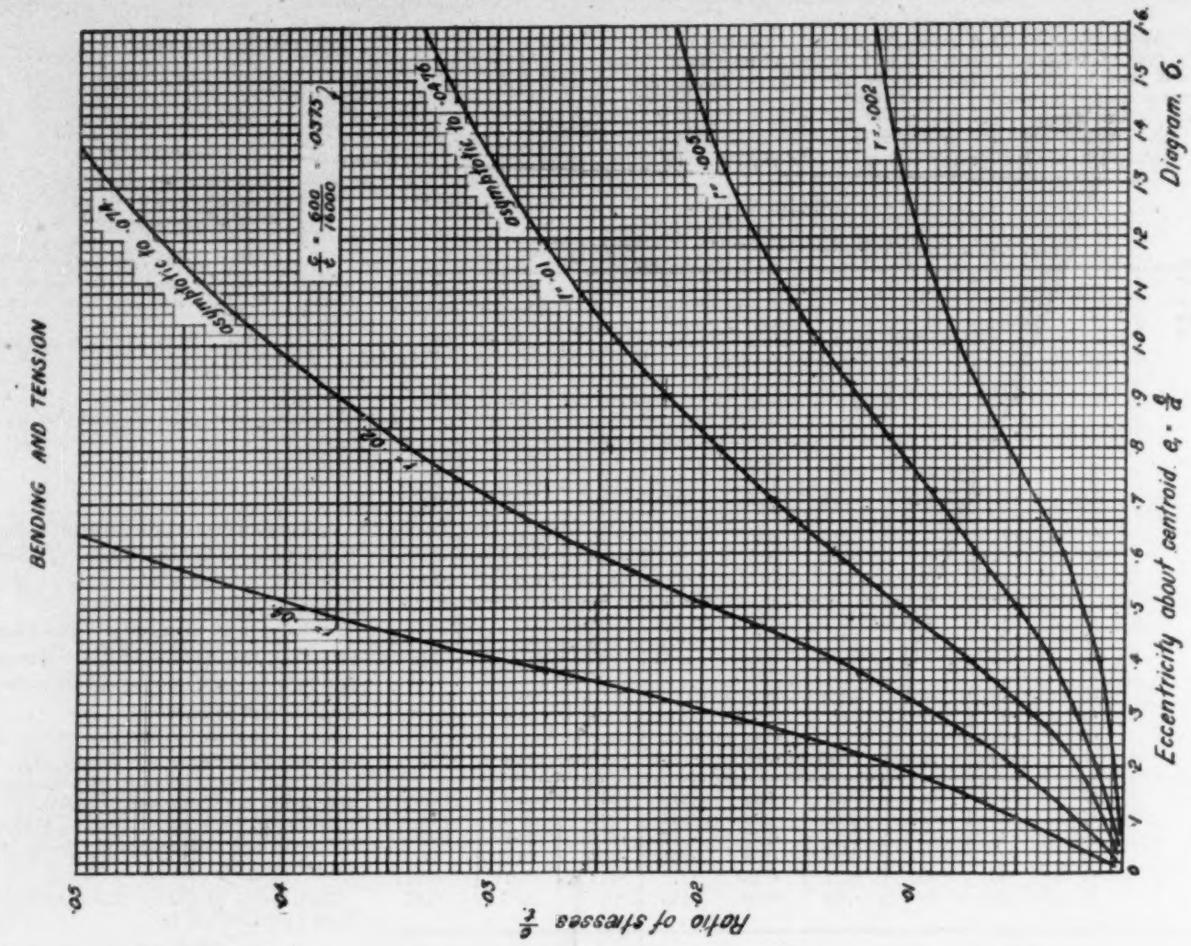


Diagram. 6.
Eccentricity about centroid $e_1 = \frac{M}{P}$
Ratio of stresses $\frac{f'_c}{f_c}$
BENDING AND TENSION
Osymbiotic to .074
Osymbiotic to .0975
$\frac{f'_c}{f_c} = \frac{600}{6000} = .0375$
r = .002
r = .005
r = .01
r = .02
r = .03
r = .04

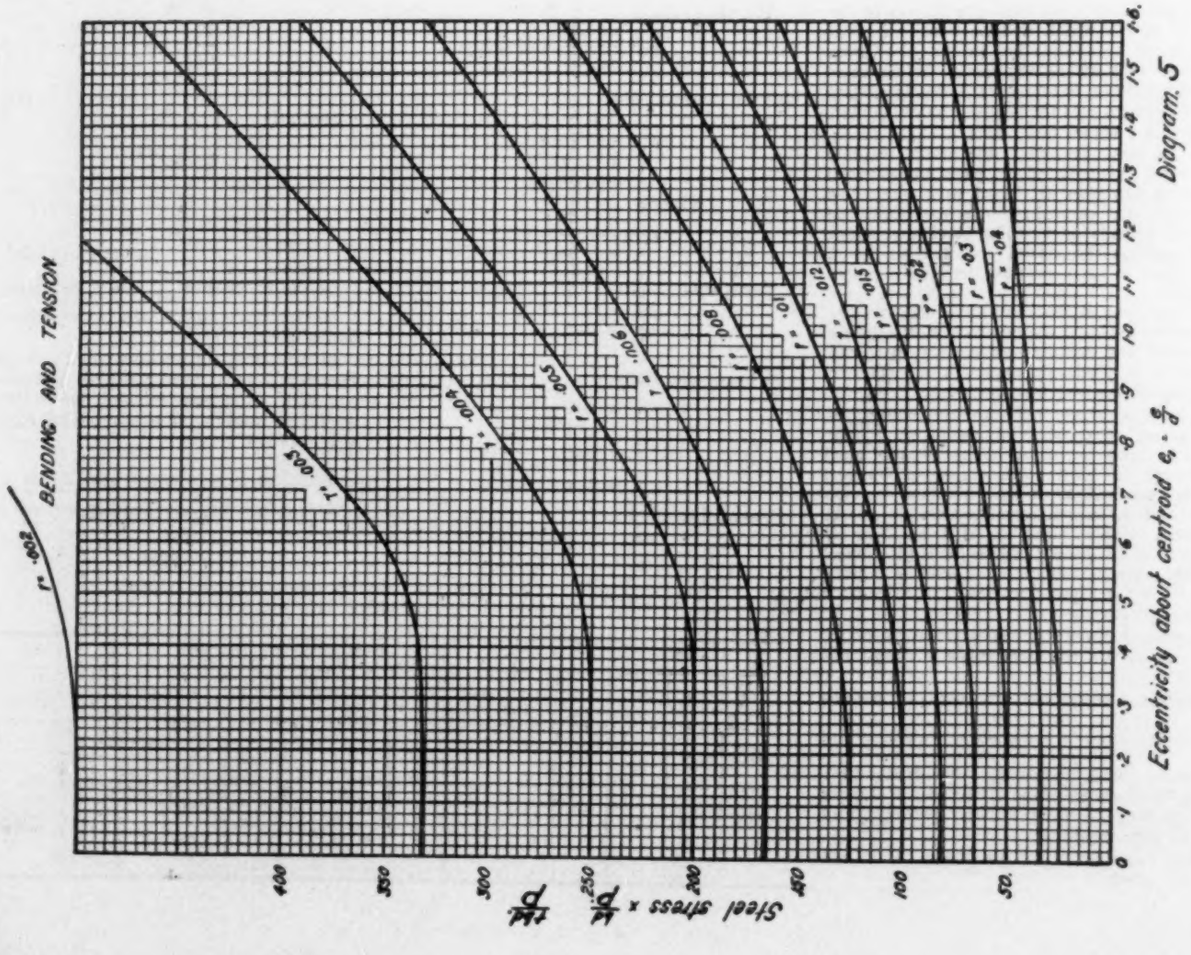


Diagram. 5
Eccentricity about centroid $e_1 = \frac{M}{P}$
Steel stress $\times \frac{t+d}{t} \frac{P}{A'_s}$
BENDING AND TENSION
r = .002
r = .003
r = .004
r = .005
r = .006
r = .008
r = .01
r = .012
r = .015
r = .02
r = .03
r = .04

An example of design with Diagram 7 will now be given.

EXAMPLE 2: A beam has to carry a direct tension of 20,000 lb. and a moment of 100,000 in. lb. Select a suitable section for maximum stresses not to exceed 600 and 16,000.

Solution: Take

$$d = 20 \text{ in.}$$

$$e = \frac{M}{P} = \frac{100{,}000}{20{,}000} = 5 \text{ in.}$$

Then

$$e_1 = \frac{e}{d} = \cdot 25$$

Hence, from Diagram 7, with $r = \cdot 01$,

$$\frac{P}{b\,d} = 158 \qquad b = \frac{P}{158d} = \frac{20{,}000}{158 \times 20}$$

$$= 6 \cdot 35 \text{ in.}$$

Area of steel $\cdot 01 \times 20 \times 6 \cdot 35 = 1 \cdot 27$ in.^{2}.

Clearly alternative solutions with other depths and percentages can readily be calculated with ease from the diagram.

CASE III: WHEN e_1 EXCEEDS 1·6.

For the sake of accuracy and clearness, the range of the curves was limited to e_1 up to 1·6.

Beyond this, the stresses due to moment so far outweigh those due to direct tension that it is accurate enough for most purposes to calculate the stresses due to bending only, and add $\frac{P}{A + \frac{bn}{m}}$ to the tensile stress and deduct $\frac{P}{Am + bn}$ from the compressive stress as the effect of the direct tension.

EXAMPLE III: Suppose a beam having—

$d = 10$ in.
$b = 6$ in.
$A = \cdot 614$ in.

is subject to a tension of 3,000 lb. and a moment of 48,000 in./lb.

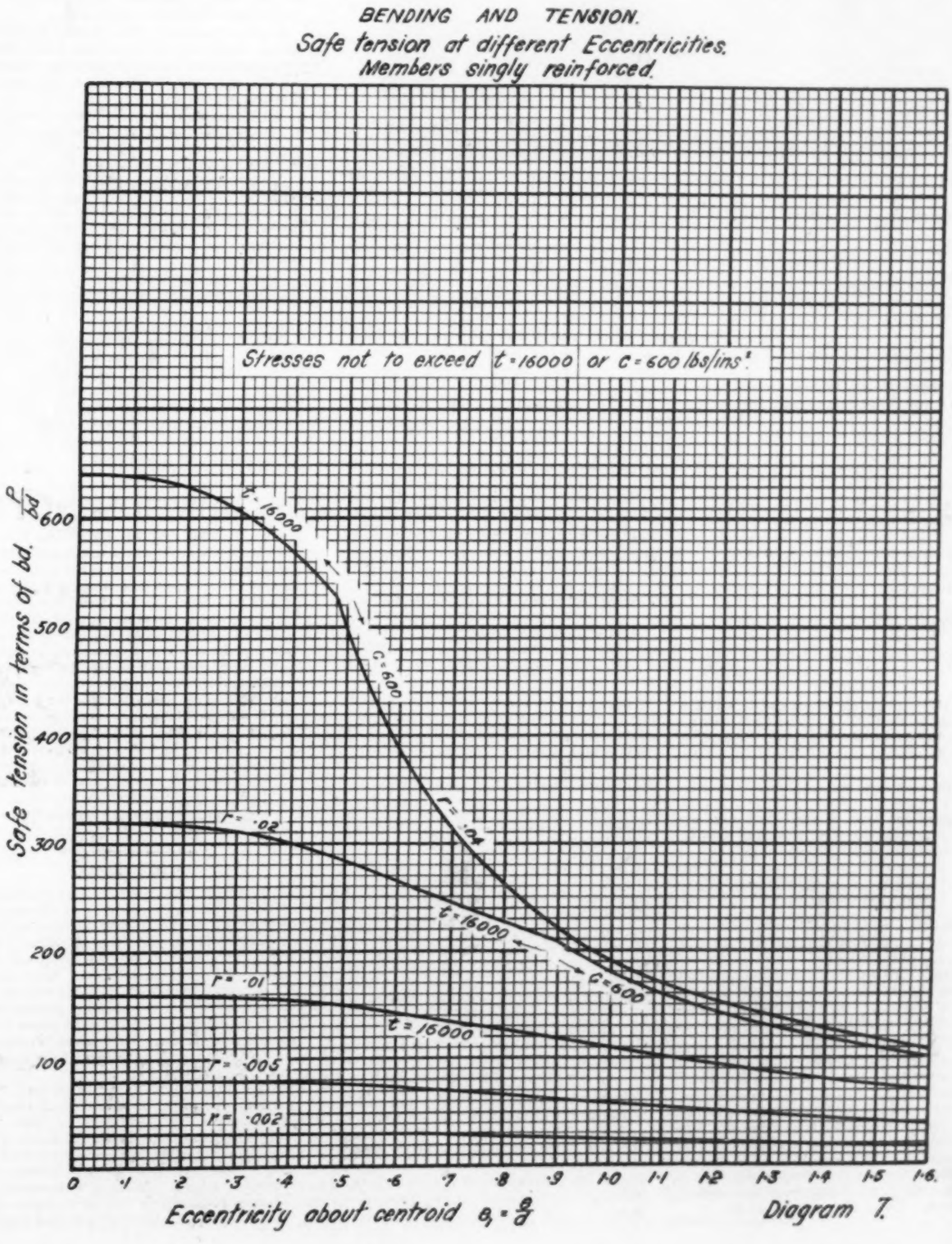


Diagram 7.

Then

$$e = \frac{M}{P} = \frac{48,000}{3,000} = 16 \text{ in.}$$

$$\therefore e_1 = \frac{e}{d} = 1{\cdot}6$$

This, then, is a borderline case and can be treated as under Case III or by means of the curves.

Under Case III, $r = {\cdot}0102$ ($p = 1{\cdot}02$).

When

$$n_1 = {\cdot}42 \quad n = 4{\cdot}2 \text{ in.}$$
$$a_1 = {\cdot}86 \quad a = 8{\cdot}6 \text{ in.}$$

$$\therefore \text{Total compression} = \frac{M}{a} = \frac{48,000}{8{\cdot}6} = 5,600 \text{ lb.}$$

$$= nb\frac{c}{2}$$

$$= 4{\cdot}2 \times 6 \times \frac{c}{2}$$

$$= 12{\cdot}6\ c$$

Whence

$$c = \frac{5,600}{12{\cdot}6} = 445 \text{ lb./in.}^2$$

$$t = \frac{5,600}{{\cdot}614} = 9,120 \text{ lb./in.}^2$$

To allow for the direct tension add to t

$$\frac{P}{\frac{bn}{m} + A} = \frac{3,000}{\frac{6 \times 4{\cdot}2}{15} + {\cdot}614} = 1,305 \text{ lb./in.}^2$$

and deduct from c

$$\frac{P}{Am + bn} = \frac{3,000}{34{\cdot}4} = 87 \text{ lb./in.}^2$$

leaving

$$t = 9,120 + 1,305 = 10,425 \text{ lb./in.}^2$$
$$c = 452 - 87 = 358 \text{ lb./in.}^2$$

Solution (under Case II) by Diagrams:

$r = {\cdot}0102$ $\qquad e_1 = 1{\cdot}6$

From Diagram 4

$$\frac{cbd}{P} = 6{\cdot}95$$

Whence

$$c = 6{\cdot}95 \times \frac{P}{bd}$$

$$= 6{\cdot}95 \times \frac{3,000}{6 \times 10} = 347{\cdot}5 \text{ lb./in.}^2$$

From Diagram 5

$$\frac{tbd}{P} = 2{\cdot}26$$

Whence

$$t = 2{\cdot}26 \times \frac{3,000}{6 \times 10} = 11,300 \text{ lb./in.}^2$$

It will be seen that the approximate solution does not differ badly from the accurate one by the diagrams, and as the eccentricity diminishes, this error diminishes with it.

The expression $A + \frac{bn}{m}$

is the equivalent area of steel plus concrete under stress expressed in steel units, and $Am + bn$ is the same expressed in concrete units.

CASE IV: WHEN COMPRESSION REINFORCEMENT ALSO IS PROVIDED.

The solution in this case is most readily made by considering the compressive reinforcement as increasing the strength of the compressive side, and therefore equivalent to a beam without compression reinforcement, but having increased breadth of concrete. The diagrams lend themselves readily to this. An example will illustrate the method.

EXAMPLE IV: Let us recalculate example I with the addition of two ¾-in. diameter rods in compression, 1¼ in. from the compressed edge, P being 6,000 lb. and M60,000 in. / lb. as before. The first thing is to select a trial value of n. As the conditions are not much altered by the compression steel, it is well to use for this the value obtained when the compression steel is neglected. This, we found from Example I, was 2·66 in. Then we can calculate.

Total compression in concrete,

$$= nb\frac{c}{2} = 2{\cdot}66 \times 6 \times \frac{c}{2} = 8{\cdot}0\ c \text{ lb.}$$

Total additional compression due to compression steel

$$= A(m-1)c \times \frac{n - 1\frac{1}{4} \text{ in.}}{n}$$

$$= {\cdot}614 \times 14 \times \frac{1{\cdot}41}{2{\cdot}66}\ c = 4{\cdot}6\ c$$

Hence the effect of the compression steel is equivalent to increasing the breadth of concrete to

$$6 \times \frac{8{\cdot}0 + 4{\cdot}6}{8}$$

$$b = 9{\cdot}45 \text{ in.}$$

The beam may now be treated as a singly reinforced beam of this breadth, when

$$r = \frac{{\cdot}614}{10 \times 9{\cdot}45} = {\cdot}0065$$

and $e_1 = 1$ as before.

whence from Diagram 2, $n_1 = {\cdot}21$

$$n = 2{\cdot}1 \text{ in.}$$

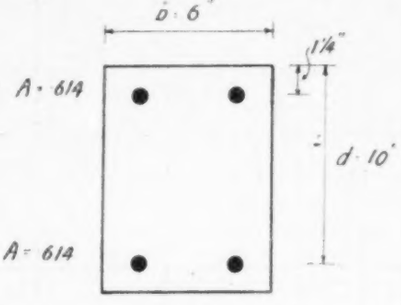


Fig 3

This differs appreciably from the assumed value of 2·66 and for great accuracy a second approximation is desirable as before.

C from concrete $2{\cdot}1 \times 6 \times \frac{c}{2} = 6{\cdot}6\ c$

c from steel ${\cdot}614 \times 14 \times \frac{{\cdot}85}{2{\cdot}1}\ c = 3{\cdot}46\ c$

Hence equivalent breadth is

$$6 \times \frac{10{\cdot}06}{6{\cdot}6} = 9{\cdot}15 \text{ in.}$$

Whence $r = \frac{{\cdot}614}{10 \times 9{\cdot}15} = {\cdot}00673$

and n, from Diagram II, is 2·15, which agrees well enough with the previous value 2·1.

Then from Diagram 4 $\frac{cbd}{P} = 3{\cdot}92$

Whence $c = \frac{3{\cdot}92 \times 6,000}{9{\cdot}15 \times 10} = 257 \text{ lb./in.}^2$

From Diagram 5 $\frac{tbd}{P} = 2{\cdot}15$

Whence $t = 2{\cdot}15 \times \frac{6,000}{9{\cdot}15 \times 10} = 14,100 \text{ lb./in.}^2$

Comparing these results with those of Example I for the beam unreinforced in compression (363 and 14,520), it will be seen that the effect is small, especially on the tension side, as might have been expected.

CASE V: WHEN, INSTEAD OF THE MOMENT OR ECCENTRICITY BEING GIVEN, THE POSITION OF RESULTANT TENSION IS GIVEN.

In this case, the eccentricity can at once be found from Diagram 1, and the procedure is then as before. In cases when $e_1 - f_1$ exceeds 1 and the case is off the curves, e may be taken as $(e-f) + (d-n)$, its correct value for pure bending, n being the depth of neutral axis for pure bending corresponding to the particular steel ratio.

MINUTES OF THE R.I.B.A.

The following are notes from the Minutes of the R.I.B.A. Council Meeting held on Dec. 18:—

EXHIBITION OF ARCHITECTURE, TOWN-PLANNING, AND COMPLEMENTARY ARTS.—The Council approved in principle and referred to the Art Standing Committee for constructive consideration a proposal for the holding of an exhibition of architecture, town-planning, and the following complementary arts:—

(1) Mural decorative painting.

(2) Sculpture and ornamental carving and casting.

(3) (*a*) Furniture and woodwork; (*b*) tapestries, weaving, and decorative hangings; (*c*) pottery and ceramics; (*d*) metalwork; (*e*) household utensils and appliances.

LONDON SQUARES.—The Council endorsed the action taken by the Art and Town-Planning Committees and the London Society with regard to the measures to be taken for protecting London squares.

THE FRANCO-BRITISH UNION OF ARCHITECTS.—The Council made a grant of £20 in aid of the work of the British Committee of the Franco-British Union of Architects for the current year.

THE BRITISH ENGINEERING STANDARDS ASSOCIATION.—Mr. Max Clarke was appointed to represent the R.I.B.A. on a sub-committee appointed to consider the standardisation of cast-iron half-round, ogee, and other moulded gutters.

NATIONAL REGISTRATION OF PLUMBERS.—Mr. H. D. Searles-Wood was appointed to represent the R.I.B.A. on the Council for the National Registration of Plumbers.

THE ROYAL SANITARY INSTITUTE CONGRESS, 1923.—Mr. H. D. Searles-Wood and Mr. John Bilson were appointed representatives of the R.I.B.A. at the thirty-fourth congress and exhibition of the Royal Sanitary Institute, to be held in Hull from July 30 to August 4, 1923.

REINSTATEMENT.—Mr. Harold Burleigh was reinstated as an Associate.

EXHIBITION NOTES.

THE PASTEL SOCIETY.

The development of the art of pastel in recent years has apparently led to a greater appreciation and understanding of its values, and the twenty-fourth exhibition of the Pastel Society, opened this week at the Royal Institute, should do much still further to establish the value of this expressive medium. The pictures are exceptionally well hung this year in groups representative of various artists, which certainly appears to emphasise the characteristics and powers of each artist. The general impression conveyed in the large gallery is that pastel yields to no other medium in force or brilliance of effect. There are subtle beauties of oil or water-colour which it may not reach, but it is capable, in capable hands, of a great variety of expression.

Some further notes on this exhibition will be given next week.

Staff Dinners.

On Friday, December 22nd, at the Town Hall, Leamington, the employees of Messrs. Sidney Flavel & Co., Ltd., were entertained by Mr. Percival Flavel, J.P., the Managing Director. The Chairman's health was proposed by Mr. Thomas Sanderson, who has been associated with the firm for 53 years. He referred to the fact that he had known three generations, and that the business had, in recent years, increased four times in size. There were between seven and eight hundred guests who fully appreciated the hospitality provided.

The annual staff dinner of Messrs. Courtney & Fairbairn, Ltd., of Albany-road, Camberwell, took place recently at "Ye Olde Mitre," Chancery-lane. Mr. J. D. Fairbairn (Director) occupied the chair, and was supported by Mr. A. S. Courtney (Director) and numerous architectural friends. After a well-served dinner, during which toasts were given by members of the company, a musical programme was enjoyed.

THE COLONIAL BANK, GEORGETOWN, DEMERARA.

THE new premises for the Colonial Bank at Georgetown, Demerara, have now been completed by Messrs. S. Pearson & Son (Contracting Department), Ltd., London, from the design of Mr. Stanley Barrett, F.S.Arc., of Messrs. Stanley Barrett & Driver, architects, of Lower Seymour-street, London. The design is classic, based on the Doric order of the Temple of Marcellus, Rome, and all unnecessary ornament has been avoided.

The building has a frontage of 62 ft. 6 in., and a return of 122 ft. 9 in. Doric columns, 20 ft. high, support a massive classic entablature and cornice, forming a wide open colonnade the whole length of the elevations. The colonnade is raised 18 in. above the pavement level, and is approached by wide marble steps in the centre of the elevation, where the main entrance doors are situated. The roof is flat, with a slight fall from the centre to the side gutters, which are concealed from view and formed in the surface of the concrete above the cornice. Upon the roof over the banking hall is a reinforced concrete dome, 34 ft. 6 in. in diameter, in which are eight dormer openings, six of which are glazed to allow light to be reflected downwards from the spherical surface of the dome, while the other two openings are fitted with powerful exhaust fans.

The construction is notable for its simplicity, and consists of piers and columns evenly spaced to support the floors and roof, the spaces being filled with glazed and louvred windows and doors, which allow a free passage of air in all directions. The whole front portion of the building is occupied with the large banking hall, over 50 ft. wide by 70 ft. long, and 32 ft. high from floor to dome. Around the banking hall is a wide octagonal gallery supported by Doric columns, around the edge of which is a classic balustrade.

The foundations consist of a raft of concrete resting on and associated with a system of concrete beams over the entire area and strongly reinforced with steel bars. Upon this raft the superstructure of the building has been framed and moulded in concrete. Every column, beam, floor, and roof slab has its steel reinforcement hooked or tied in with its neighbouring unit so that the whole fabric is practically a network of steel rods surrounded by concrete, which allows of the column and beam units being fabricated in advance and placed in position as the construction advances.

The Colonial Bank, Georgetown Demerara. MR. STANLEY BARRETT, Architect.

The surfaces of the concrete within the building have been distempered white, except the walls and pilasters, which are pale green. A narrow skirting in dull black has been run around the whole of the walls inside, and adds to the finish of the work.

The floors are paved with 1-in. terrazzo marble tiles in the colonnades and public spaces, and 2-in. pitch pine and English oak blocks in the administrative offices and banking hall. The latter form of block flooring is laid in "basket" pattern with metal tongues on a surface of hot bitumen over a waterproofed cement under-base. This form of construction eliminates any possibility of damp arising and lifting the floor. Special attention has been paid to the joinery, which has been carried out in brownheart, a hardwood from Dutch Guiana weighing about 66 lb. per cu. ft.

The constructional steelwork in the coat-of-arms, grille, and Bostwick gates has been supplied by Messrs. Galsworthy, Ltd., London. The electric fittings, all in bronze, have also been supplied by Messrs. Galsworthy, Ltd. The polished plate glass in doors and windows has been supplied by Messrs. Pilkingtons, St. Helens, and the "Flemish" and "Artic" glass by Messrs. Chance Bros., Birmingham.

The dimensions of the building are: length, 122 ft. 9 in.; breadth, 62 ft. 6 in.; height, pavement to cornice, 24 ft. 4 in.; pavement to top of dome, 34 ft. 3½ in. The materials used were: crushed granite, 1,100 tons; river sand, 680 tons; Portland cement, 350 tons; steel reinforcement, 45 tons.

The building has been constructed throughout in reinforced concrete on the "Coignet" system, to the detail drawings of Messrs. Edmond Coignet, Ltd., 125, Gower Street, W.C.1.

During the construction of the building the interests of the Colonial Bank have been looked after by their engineer, Mr. Cecil J. Allen, whilst the contractors were represented by their engineer, Mr. F. R. Ward-James, with Mr. J. L. B. Morris as accountant and cashier, and Mr. H. A. Amo as foreman in charge.

The Colonial Bank, Georgetown, Demerara. MR. STANLEY BARRETT, Architect.

NOTES ON CONCRETE.

BY A CONCRETE SPECIALIST.

In the production of concrete there are five factors which are important, viz., cement, aggregate, water, workmanship, and atmospheric conditions. It is proposed to discuss the influences of each of these upon the quality of concrete and to consider possible economies in the production of concrete.

Cement.

None other than Portland cement guaranteed to comply with the British Standard Specification should be used in concrete, and if cement buyers made a practice of demanding a certificate of tests from the makers with each consignment they would be in a position to compare the qualities of respective brands and to discriminate in their purchases. Marked improvements have occurred in the quality of British cements of late years, and many brands have double the tensile strength required by the Standard Specification. Provided the setting time and the soundness tests are satisfactory the best cement is that with the highest tensile strength. With cement of high strength it should be possible in many cases to economise not only in the proportion of cement in concrete but in the dimensions of concrete work.

Of the difficulties arising in connection with concrete-laying the most prominent is due to retarded hardening, and the first tendency is to blame the cement as being the only ingredient of the concrete which has been the subject of human effort and is, therefore, most susceptible to error. Manufacturers' guarantees and certificates of tests are generally of little avail in such circumstances, and what is needed is an actual demonstration to reveal the qualities or defects of the cement.

The testing of cement is a matter for experts; the ordinary user of cement has neither the skill nor the apparatus required to ascertain whether a sample of cement complies with the Standard Specification, but without going to the full extent of comprehensive testing there is still room for some common-sense testing which will be useful as a guide and may be the means of avoiding disputes.

It has already been indicated that the most frequent difficulty met with in concrete work is failure to harden in a reasonable time, and the responsibility for this can be determined by a few simple tests within the capabilities of any builder's foreman or bricklayer. To test the setting properties of the cement, about a pound of the cement should be mixed with just sufficient water to produce a stiff paste, and by means of a trowel the paste should be moulded on a piece of iron, slate, or glass into a cake or pat about 3 in. square and 1 in. thick. This pat should be examined from time to time and its progress of setting observed. In 18 or 24 hours the pat should have hardened sufficiently to resist any impression by a thumb-nail; in 48 hours it should not be easy to break the pat in the fingers. This rough and ready test will only be of value if the cement be mixed with the minimum proportion of water into a stiff paste, and if the pat be preserved under cover in a moderately warm room or shed. If the temperature falls below 50 deg. F. the hardening of the cement will be retarded.

If it be proved in this way that the setting of the cement is satisfactory, the next step is to test the effect of the sand and other aggregate in the concrete. It is better to test each individual material separately: about 1 lb. of the cement should be mixed with about 2 lb. of the sand to be tested, and then water added to produce a stiff paste, which should be moulded into a cube-shaped block on a non-porous plate, and the sides smoothed with a trowel. This block should be kept under the conditions described for neat cement testing and should harden at somewhat the same rate. If after 24 or 48 hours the block is not hard there is evidence that the sand is faulty, and methods of discovering the reason for the defect will be described later. If both the cement and sand are proved satisfactory by these tests, a third test should be made with cement, sand, and some of the coarse aggregate (stone, gravel, broken brick, etc.) to determine the effect of this upon the setting of the concrete. When the cement, aggregate, and water have been proved satisfactory by tests and the concrete work in practice does not harden well, the conclusion must be drawn that the latter experience is the result of severe weather, defective mixing, etc. The effect of the atmospheric conditions can be observed by making duplicate sets of pats and blocks, keeping one set under cover in a warm room and the other set in the open and subjected to the same conditions as the concrete in the work. By this means the possible causes of any unsatisfactory concrete can usually be narrowed down, and when neither cement, aggregate, nor weather can be proved to be harmful there is only workmanship to be blamed.

The neat cement pat previously referred to can be used as a test for soundness or freedom from expansion by boiling the pat in water for a few hours after it has quite hardened in the air. The boiled pat should not soften or crack.

Brief mention may be made here of some of the fallacious tests of cement. The "bottle test" consists in filling a bottle or jar with cement paste and deducing expansion or contraction from the bursting of the bottle or loosening of the cement from the sides of the bottle. This test is misleading because the rates of expansion of glass and cement with rise of temperature differ, and in the great majority of cases when bottles containing set cement crack the cause is not expansion of the cement but unequal expansion and contraction of cement and glass respectively during changes of temperature.

Another fallacious test for cement is the "rise of temperature" test, or "marmalade-pot" test. This test consists in observing the rise in temperature of a paste of cement and water contained in a marmalade pot or other suitable vessel, and a cement is condemned as being "too hot" if the temperature rises during the setting more than 6 deg. F., it being assumed that the warming of the cement paste is due to the slaking of excess or uncombined lime. Since the test was devised it has been proved that the rise in temperature of cement during setting is merely the result of the chemical action of setting, and a high rise indicates a cement of active setting properties while a small rise shows the cement to be sluggish in setting.

Other tests of a similarly fallacious nature are occasionally met with, but it is safe to say that the only tests of any value that can be carried out in a rough and ready fashion by clerks of works and others on a building job are the setting tests and the boiling test already described. If the results from these are unfavourable the cement should not be unreservedly condemned, but the manufacturer should be called in and asked to bring evidence, by reference to an independent expert or otherwise, of the quality of the cement.

Concrete Aggregates.

The following definitions of fine and coarse aggregate taken from the "Tentative Specifications for Concrete Aggregates" issued by the American Society for Testing Materials are as comprehensive as can be wished for and can hardly be improved upon:—

Fine aggregate shall consist of sand, stone screenings, or other inert materials with similar characteristics, or a combination thereof, having clean, hard, strong, durable, uncoated grains, free from injurious amounts of dust, lumps, soft or flaky particles, shale, alkali, organic matter, loam or other deleterious substances.

Coarse aggregate shall consist of crushed stone, gravel, or other approved inert materials with similar characteristics, or a combination thereof, having clean, hard, strong, durable uncoated pieces free from injurious amounts of soft, friable, thin, elongated or laminated pieces, alkali, organic or other deleterious matter.

To approach perfection in concrete clean aggregates are essential, and in this connection dirty aggregates can be classed as those containing loam, clay, and organic matter. The value of cement lies in its property of combining masses of stone together by reason of its adherence to individual grains of sand or pieces of stone, but if the sand or stone is already coated with loam or clay it is obvious that the cement can only come into contact with and adhere to a film of loam or clay, thus making the strength of the concrete depend upon the adhesion between the sand or stone and the covering layer of clay or loam. When concretes containing dirty aggregates are broken up it is frequently found that the pebbles are easily detached from the concrete, and an examination of the surrounding concrete reveals a layer of loam. Another effect of dirty aggregates is that the mud they contain mixes with the cement and prevents the latter from setting and hardening. One of the most frequent causes of complaint concerning concrete is failure to harden, and in most cases the cause is the contamination of the cement with mud from the aggregate. Such complaints are more noticeable in cold, damp weather, because the mud remains in a more or less gelatinous state, but if the concrete can be dried the mud apparently becomes gritty and in this condition it interferes less with the setting of the cement.

A dirty aggregate can sometimes be detected by rubbing some of it between the hands and observing the staining effect, but a better test is to stir a handful of the sand or stone in a glass jar with water, when the loam or clay will, on settling, form a layer by itself. If the jar be marked with divisions it is possible to ascertain the proportion of loam in the aggregate by comparing the thickness of the layer of loam with that of the sand or stone. The American specification already referred to limits the amount of clay or loam in sand (material removable by washing) to 3 per cent., but it is perhaps hardly desirable to lay down a rule as to the proportion of loam that is permissible in concrete aggregates, because much depends on the nature of the loam and whether the concrete will be in a warm and dry atmosphere or wet and cold. Some aggregates containing as much as 10 per cent. of loam are used with success, while, on the other hand, the presence of less than 5 per cent. of loam seriously interferes with the hardening in some cases. To be on the safe side, it is advisable to wash all aggregates liable to be dirty, and especially pit sands and ballasts. The latter are subject to great variation as they are dug, and frequent examinations and tests as above are desirable when such aggregates are used.

Sand or gravel containing organic matter (vegetable debris or animal refuse) is particularly objectionable for use with cement.

and there is a simple test for organic matter which can be applied by clerks of works or foremen without difficulty. The test is conducted by shaking some of the sand in a white glass bottle with a 3 per cent. solution of caustic soda, and allowing the mixture to stand for 24 hours. The amount of caustic soda solution used should be such that when in the bottle the bulk of solution should be about equal to the bulk of sand. If after standing for 24 hours the colour of the solution is no more than a pale yellow the sand may be assumed to be free from objectionable organic matter, but if the colour is a marked yellow or brown the presence of organic matter is indicated, and such sand would not produce a good quality concrete.

Turning to the consideration of artificial aggregates, such as broken brick, clinker, etc., it is of prime importance that such materials should be free from coal or partly-consumed coal, otherwise there is a risk of the concrete expanding after it has set. Coke breeze is largely used as a concrete aggregate with satisfactory results where no great strength is demanded, but here again it essential that the breeze should contain no coal. With broken brick there is the possible danger of lime being included from adhering mortar or sulphate of lime from "Sirapite" or other plastering, so that broken brick is not safe to use as an aggregate unless the bricks have been well cleaned. Certain classes of brick made from clay containing pyrites are liable to contain sulphur in an active form, and when this is the case concrete containing such broken brick is liable to swell after setting, especially if in a damp situation. Broken brick is, of course, a porous aggregate, and all porous aggregates (and these include some varieties of stone) should be well soaked with water before use, otherwise they will absorb from the concrete the water required for the setting action of the cement, thus causing imperfect hardening and cracking of the concrete. Some porous aggregates are slow in absorbing water, and it is therefore safer to soak them with water the day before use and again immediately before use.

The grading of concrete aggregate, by which is meant the relative sizes of the grains and lumps of which it is comprised, is of great importance. Some American investigators have recently shown that a concrete mix of 8 to 1 can be made as strong as a mix of 6 to 1 by altering the sizes of the sand and stone. When fine or dusty aggregate is used an additional quantity of water is required for mixing, and in consequence of this the concrete is weakened. For the best results the proportion of dust or fine material in concrete aggregate should not exceed 10 per cent. as ascertained by sifting the material on a sieve of 50 meshes per linear inch.

In selecting and proportioning the materials for concrete the basis of the operations should be that the proportion of cement should be at least sufficient to fill the voids in the sand, and that the proportion of sand should be that required to fill the voids in the stone. The most economical concrete will, therefore, be that which has the lowest voids in both sand and stone. If stone containing 33 per cent. of voids is obtainable the proportion of sand to stone may be as one to three, and if the voids in the sand are also as low as 33 per cent. the proportion of cement to sand may be as one to three. The theoretical concrete mix with such materials would therefore be 1:3:9, but as a margin of cement and sand is desirable to allow for uneven mixing such a mix in practice would be 1:2½:6. If the voids in the sand and stone are less than 33 per cent. the concrete mix could be still weaker without producing an unduly weak and porous concrete, while if the voids are higher the mix must be richer.

"DAILY MAIL" BUNGALOW COMPETITION.

We have received the following criticisms of the winning designs in this competition from Mr. J. R. Thorn, of Southsea:—

Applicable to 1st, 2nd, and 3rd Premiated Designs.

1. The assessors, or the competitors, seem to have but one idea of what a bungalow should be, and the former have chosen all the premiated designs from one type of plan, with the plans identical but for minor arrangements. The type selected might be called "elongated" (as opposed to "compact"), with a long row of rooms and connecting corridor almost the entire length of all the rooms.

2. The type of plan chosen is excessively expensive, giving a large area of external walls, with consequent extra cost of brickwork, external facing, and exposure of walls to the sun's heat (and cold exposure if bungalow should be used in the winter).

3. Each of the winning designs has a corridor almost the entire length of the long building (3rd premiated plan has corridor 55 ft. long), rather like a bowling alley.

4. No compass has been indicated on any of the premiated designs—this is unusual where so much depends upon the aspect. If one might assume that the garden front faces south, there are several items worthy of reconsideration. Each plan would appear to give a far more useful garden front, with quainter elevation on that side, if the wings projected on the garden side instead of on the north. The terrace, beautifully walled in on either side by the wings of building, protected from any unkind side wind, would form an admirable sitting-out space on the south side, especially if a sun-blind were provided, where open-air meals could be enjoyed, right from late spring to early autumn. Unfortunately this grand space is on the cold north side in all the winning designs.

5. All three designs have very plain elevations, especially to the garden front. Without extra expense more picturesque elevations could have been designed by having better proportioned windows, notably in the corridors, where long low casement windows would have given better lighting and appearance. One of the assessors (Mr. E. Guy Dawber) and Sir Edwin Lutyens freely use this class of casement in their buildings.

6. The maid's (singular!) suite occupies rather an extravagant area of the plan, and would indicate that since the war the domestic is coming into her own and demands a large share of accommodation, with ample space in her sitting-room for a piano, where her admirers shall be allowed to approach, undisturbed from the side entrance. Before the war a bed-sitting-room or a sitting-room with curtained bed recess would have been considered suitable. The maid's suite, including kitchen, would require some little daily care to keep in order. Unless the "ladies of the house" assisted considerably in the cooking and running of the house, I fear the one maid provided for would not have much time to spend in her sitting-room.

7. Food accommodation seems scanty, as a bungalow may be some little way from supplies. The 3rd premiated design seems to have omitted anything worthy of the name of "pantry."

8. The sanitary conveniences would cost less for drainage if they could have been grouped more closely together.

9. Electricity and gas are not always available where bungalows are built, and the former is expensive for heating, etc.

10. The great advantage of being able to combine drawing and dining-room has only been obtained in the 3rd premiated design. In the second premiated design the chimney breasts between the two rooms make this impossible.

11. The chosen designs are all by fully qualified architects, and the highest possible results should have been expected.

Applicable to First Premiated Design.

1. This design specially illustrates the extravagance of the "elongated" type of plan. It will be seen by a glance at the plan that the whole of the area of the terrace could be added to the internal accommodation and form, say, a large living hall or lounge, about 35 ft. long by 16 ft. wide (eliminating the whole of the long corridor, except about 10 ft., that would be required to screen off the w.c. and bedrooms, which could be constructed in 2½ in. concrete). To gain all this extra accommodation it would only be necessary to bring out the walls of lobbies and hall from present position to the face line of the wings. Less brickwork would actually be required, for the side walls of the wings next the terrace would become interior walls and could be 4½ in. thick instead of 11 in. hollow walls. All this cubic space could be added at the comparative low cost of a few additional yards of plaster, additional roof covering, and a small light over the bedroom lobby (the terrace paving covering the cost of cheap floor). How this huge space would reduce the cost per cubic foot!

2. The garden space for sitting out is so close to the maid's bedroom that all conversation could be overheard, and is also so near to the w.c. that cistern discharges would be objectionable, unless a very silent pattern were used.

3. The dining-room appears to be placed on the cold north aspect—there is not even a window in the west wall to pick up "the last long lingering rays of the setting sun." Perhaps the occupants will be content with midday dinner and will be glad to have a cool sunless dining-room.

4. The best bedroom has a window in each of three walls and a door on the fourth, so should not lack light and ventilation, even if a little difficult for sleep in the early light of summer mornings. (If used in the winter this room would be difficult to keep warm with windows and three external walls—it is good that a coal fire can be accommodated.)

5. Many of the best architects seem to be using roughcast elevations less than formerly—with hollow walls it is useless, soon gets grimy with dirt and smoke, and is really false. A good honest well-built clamp brick with beautiful texture and varying tints, well pointed, is as cheap, and the true wall really does show. The brick face would be as charming, or more so in 50 years' time when the roughcast will probably be out of date and, if still remaining on the walls, will have had many coats of cement-wash, and would look worse than ever. The elevations of 1st premiated design are commonplace, with windows very poorly proportioned.

Applicable to 2nd and 3rd Premiated Designs.

1. Both these designs show principal bedrooms on the south or garden front, and they would be like ovens when one retired to rest (compare this with the cool position of the maids' rooms in 2nd premiated design).

2. The 3rd premiated design would be improved by extending the corridor windows past both swing doors, especially so at the bedroom end, as that part of the passage is badly lighted.

3. A large lounge hall could equally be added to these designs almost without extra cost, as mentioned in (1) under 1st prize design, eliminating almost the entire corridors.

4. Second design-elevation is one degree better than good army hut. Third design-elevation, if pent roof were added, would make a good typical country railway station.

CORRESPONDENCE.

The Housing Problem.

SIR,—In his recent speech the Prime Minister suggested that it might become necessary for the Government to promote a further housing scheme. In view of the terrible cost of the Government scheme lately completed, this would seem to be a policy of despair. Taxpayers are burdened with the payment of £9,000,000 a year for 60 years under the recent scheme. This surely ought to be sufficient warning against any fresh commitments.

With the utmost respect to those who are responsible, I venture to say that they are losing sight of some of the elementary factors of the problem which are vital for its solution:—

1. Housing, like farming, is one of the basic industries, and we possess throughout the country a sufficient organisation of experienced builders with all the labour at command to supply our needs, but they have been hopelessly handicapped during the last 15 years through the well-meant but ill-devised Government interference with the industry.

2. In the past the larger proportion of houses have been provided by small private builders.

3. Houses can be provided in this way at the lowest possible cost, both in labour and material, for reasons which are readily appreciated by any practical builder.

4. In view of the increased cost of building it is of first importance that houses should be built as economically as possible.

5. If this is to be done, the small builders of the country must be got to work.

6. At present most of their capital is locked up in existing property which comes within the limits of the Rent Restriction Act and cannot be realised.

I suggest that the soundest course for the Government is to recognise this position and either to hand back to building owners their property (which is now in the hands of the tenants) so that they can realise it, or to advance to them at least the pre-war value of their houses. The whole of the responsible statesmen of the country denounce the doctrines of communism, but do not the provisions of the Rent Restriction Act come perilously near communism?

It is a very insidious danger because, by the Act, the State, in effect, hands over part of the property of the minority to the majority. The large majority of the constituents of every member of Parliament and of readers of the daily press are benefiting by the Act at the expense of the owners of the houses they occupy. It is fatally easy, therefore, for Parliamentary candidates and journalists to find good reasons for continuing this gratuity to the tenants at no expense to themselves. If communism ever becomes a force in this country the precedent will undoubtedly be used to carry the practice to much greater lengths. The principle of self-help, not to mention honesty, is the best policy.

The proposal for a capital levy has been rejected by all our leading statesmen, in spite of the fact that by the present statutory provisions the Government is tying up a very large proportion of the capital used in the basic industry of house-building.

If the small builders could get to work with the co-operation of architects, they would, I am convinced, quickly overtake the housing arrears and in so doing considerably lessen the terrible evil of unemployment.

The needs of the helpless should be considered and dealt with entirely apart from the needs of those who can pay an economic rent. For the latter the most important aim is to foster self-reliance and discourage the growing tendency to dependence on State aid.

WALTER COOK.

The Housing Shortage.

SIR,—I think Mr. Yerbury has inadvertently made a little mistake in his excellent letter on this subject, published in your issue for December 22. On the basis of one-sixth of the income of £4 2s. per week the amount not to be exceeded for rent, rates, and taxes would be £35 10s. 8d. per annum (13s. 8d. per week) and not "£18 4s. per annum (7s. per week)" as stated.

"CONSTANT READER."

Justification of the Average.

SIR,—In reading Mr. Hallward's article, "The Justification of the Average," which was published in last week's issue of *The Builder*, the question arises, How can the common virtues and talents which the writer mentions be developed so as to penetrate our national life sufficiently to give it direction and unity of purpose?

Must not our hope be in education that will illustrate the moral worth of the individual to himself and to the community, and which will point the way towards the asceticism to which Mr. Hallward refers, emphasising also the spiritual significance of the really necessary work in the world, as a means whereby life's mysteries are unfolded to our consciousness?

By this acceptance of the spiritual basis of labour, and its implications, would not man's handiwork become reinvested with interest and beauty, and would there not come about quite naturally that readjustment of values for which Mr. Hallward pleads?

ERNEST CRUTCHLEY, A.R.I.B.A.

Chingford.

The Architect as Traveller.

SIR,—In the *Daily Mail* of December 27 it is stated that a distinguished English architect practising in the United States has recently visited England and that he is so much impressed by the fact that commercial architecture at home is not carried out by the younger architects to the economic advantage of the building owner, that he proposes to institute a competition for a travelling studentship to the United States to enable the holder to study the large industrial buildings and commercial undertakings in America.

Following on this is your leading article of December 29 in which you give reasons for expressing the hope that some pious donor will provide a post-graduate scholarship to further the study of modern architecture abroad following the precedent of the R.I.B.A. Godwin Bursary.

In the November issue of *Architecture* there is an announcement to the effect that the Society is establishing a scholarship to provide facilities for the study on the spot of American architecture and methods. The details of this proposal are being dealt with by a Committee, and in due course a further announcement on the subject will be made by the Society.

C. MCARTHUR BUTLER,
Secretary of the Society of Architects.

Bungalow Competition.

SIR,—Your publication of the premiated designs in the Bungalow Competition is very interesting, but the outcome of this much-advertised scheme will be disappointing to many seekers for new homes. One of the expressed objects of the competition was to obtain plans suitable for towns and suburbs, with gas, water, and electric light available.

All three plans show buildings between 60 ft. and 70 ft. long, with open passages at both ends for access to gardens and for tradesmen. Now, to find sites with 80 ft. or 90 ft. frontage, in towns or suburbs, would be very difficult and expensive. On the other hand, if the building were placed with either end toward the road, in order to get it in the site, the front and back windows would only gaze on the bare flanks of adjoining houses.

One peculiarity of the selected designs is that all three are so very similar in plan and arrangement that all might have emanated from one brain. Surely, out of seven hundred sets, a little variety in shape and arrangement might have been found to suit the varying requirements and conditions of thousands of house-seekers. The long, narrow passage in each is not only uninteresting, but as it only serves rooms on one side it is a wasteful and cold contrivance, on similar lines to the elementary plans of officers' war huts.

Nearly all the rooms are so similar in shape and size as to be square, monotonous barrack rooms. The dining or bedrooms placed in projecting wings have three outside walls, and would be expensive to build and cold in use. If the back or garden side were to face south, this would be accentuated, but if the front looked south the principal rooms would have a cold north aspect. It would appear to be a much better solution to place all administrative rooms, such as kitchen, offices, bath and subsidiary bedrooms—that is, all small rooms—to the north side of the corridor, and the principal and reception rooms facing south. This would have produced a squarer, more economical, and warmer residence.

All the plans have very inadequate kitchens, especially as no sculleries were allowed. A room 7 ft. 6 in. square has to contain all cooking, cleaning, pastry-making and food preparation and water heating apparatus. One of the kitchens is only 6 ft. wide, crowded with fittings. If one person could work comfortably in the narrow passage it would be impossible for two to pass, and the mistress venturing to intrude would feel more a trespasser than even in larger kitchens. Some of the rooms are very disproportionate in size to their relative importance. In one plan the drawing-room is 13 ft. by 10 ft., smaller than either of the principal bedrooms. The dining-room also, where the whole family assembles, is no larger than the principal bedroom for one or two persons, and all these rooms are square and bare as a workman's cottage. Surely, an occasional bay window would have made a not very expensive but very welcome relief.

No boxroom is provided, and store space is cramped, which has been one of the defects of bungalows hitherto. Some of the bathrooms also are very mean. In two plans the only entrance to the maid's bedroom is through her sitting-room, making it impossible for the room to be used by one of the family if the servant does not sleep in.

One of the professed aims of the competition was to produce a "labour-saving home," but the published plans show no advance on the Ideal Home Exhibition of 1920. A general system of central heating (one of the greatest comforts and labour saving schemes yet devised, and general in the States and Colonies) is not adopted. Old-fashioned chimney breasts are shown in nearly all rooms, expensive to build, cumbrous, wasteful to light and tend, and frequently unused in bedrooms. Few other economical devices are shown or specified. As a collection of fifty selected designs is to be published, it is to be hoped some others will show modern improvements and a welcome variety in plan. It would be most interesting if the whole number (omitting, possibly, some freaks) could be shown to the anxious public in March next.

CITIZEN.

Bungalow and Villa.

SIR,—Mr. Nesbitt Kemp considers that correspondents who criticised his comparative design for bungalow and "villa" failed to grasp his object in presenting these plans, and that it was viewed by us as a work of art. I do not know whether I can claim "ordinary intelligence," but I was in no danger of taking that view, and I thought I had made it sufficiently clear that my objection to his presentation of the case and to the figures of Mr. Glenn based thereon was that, while the bungalow plan was economically disposed, the "villa" was needlessly so planned as to extend the external walling and waste hall space to the magnification of the apparent advantage of bungalow arrangement and the prejudice of the two-story plan.

That was my only point, and I reaffirm it.

EDWIN GUNN.

Other Letters.

Letters are also given on pp. 55 and 59; others are unavoidably held over.

THE BUILDING TRADE.

OUTLOOK IN THE BUILDING INDUSTRY.

☞ WE have received the following contributions from some leading builders on the present position and the outlook for the future :—

THE BUILDING INDUSTRY, ITS PROSPECTS AND NEEDS.

By MR. ROLAND B. CHESSUM, F.I.O.B.
(Past-President of the London Master Builders' Association).

At the opening of the fifth New Year since the Armistice, with the burden of all the disappointed hopes of the intervening period heavy upon us, he is a bold man who will attempt to prophesy, and a wise man who seeks to draw lessons from the failures of the past with which to redeem the future. Compared with other industries, building has certainly as large an amount of arrears to make up as any other, because whereas the stocks of the world which have formerly been supplied by the exporting industries of the country must some day create a large demand for those industries to supply, the arrears of building exceed those known to anyone with whom I have been brought into contact. Its prospects should, therefore, be of the brightest, and if its needs are carefully studied, and as carefully provided for, the fair prospects should in a very large measure be realised.

The necessary prominence which has been given to the subject of the housing problem, as such, has created an erroneous impression in many minds that that is the building industry, whereas it should be remembered that prior to the war that class of building, with the exception of large blocks of tenement flats, was done almost exclusively, at any rate as far as London is concerned, by employers who were outside the membership of the National F.B.T.E. It must, therefore, not be forgotten that the arrears of building are not in any way confined to small houses for the operative artisan classes, and great as that shortage is I should be very surprised if it equalled, or indeed approached, the volume of other building which has been accumulating for years and is waiting to be put in hand at the earliest favourable opportunity.

I have served for a considerable time upon such bodies as the N.F.B.T.E., the N.W. & C.C., the L.M.B. & A.I.A. The various committees of these bodies and the Grading Commission of the N.W. & C.C. have given me many opportunities of meeting the operatives in close, intimate conference, whilst my connection with the Joint Conference of architects, surveyors and builders on the drafting of a new form of contract and other similar conferences and committees has enabled me to obtain other points of view. The experiences I have thus gained have been of great interest and value to me, and when one remembers the strife and consequent suffering which have occurred in some other industries I think everybody connected with the building industry has cause to be proud that the difficulties which had to be surmounted have all been overcome without any widespread rupture. The reduction in the wages from the zenith to the present respective rates in different parts of the country has been a real hardship to the operatives, as it is not human to welcome such events, however necessary they may have been (and they were absolutely necessary), and the success which was achieved in those events was very largely due to the statesmanship and tact and sound judgment of the operatives in the many conferences connected therewith.

On the hypothesis that there is so much work to be done, and the correctness of that hypothesis is admitted by each of the three sections of which our industry is composed, what are the needs which we must supply to realise the fair prospects which I have suggested? To deal with each of the three sections of the industry in order we will take that of the professions first. The great need we, as builders, feel is the development of the closest relationship between the architect and the builder, that mutual respect and understanding may evolve therefrom with the consequent result of higher quality of work and better value to the client; that architects should use their best endeavours to confine their inquiries to federated builders. The latter spend much time and money for the guidance and control of the industry, and regard the non-federated builder, who takes all the advantages and bears none of the burdens, much in the same way as the architects presumably regard members of their profession who stay outside the ranks of their professional institutions. We builders need the architects' support on the subject of tendering without quantities, which whilst putting each builder so tendering to greater expense than he should in fairness be expected to bear, actually means a duplication of expense which must eventually be paid by the client as increased establishment charges, whereas if quantities were supplied and taken off by one surveyor for all the builders tendering, the tenders would all be on the same basis, and thus, in fair competition, ultimately lower tenders would result because establishment charges would be reduced. We also need the greatest use to be made of the valuable work done by the Joint Committee which has produced the standard method of measurements for building which, in course of time, should also contribute to greater accuracy in competitive tendering. We likewise need the architect's and surveyor's sympathy in the matter of an agreed form of contract, and I feel sure that the frank discussion of our difficulties, and, indeed, of injustices suffered in the past, will ultimately produce something which, whilst perhaps not being all that any of the parties would desire, may indeed be a document which all will delight to recommend for use as what is fair and reasonable between the parties concerned.

The next section of the industry is the administrative, or contracting section. In this connection we desire development of the industry unfettered by the interference of Government or other officials whose knowledge of the industry is mostly superficial and theoretical, and where such interference may be found necessary we desire that those bodies should seek counsel and take advice from those—both employer and operative—who, having spent their lives in actual practice, are best able to guide and direct matters connected with the industry. As federated builders we wish it to be widely known that we entirely deny the suggestions—nay, more, the charges—made as to "rings" existing among builders to keep prices up. There are no such rings in existence, but we do deplore that "rings" do exist in connection with certain essential materials, and by a wise broadening of their specifications the architects might greatly help in overcoming this difficulty. But we do need more broad mindedness and less selfishness in the struggle for contracts. Cutting prices can benefit no one and harm many, whereas if the builders would live and let live, and refuse to take work without the slightest prospect of profit, the work would be more widely distributed and everyone connected with the industry would benefit.

As employers we need longer working hours. No industry in the country is so restricted as to hours as our industry. The increased cost in overhead charges, due to the short working day, has been a very important factor in the high cost of production. Our trade being essentially a seasonal one, it follows that from such causes shorter hours must be worked during the winter months, and our contention is that longer hours should be worked in the summer months—and surely if this should give an average of only 47½ per week all the year round no one can say that they are excessive.

And then, we want output! This, to my mind, is the principal factor which will reduce the cost of production. I know that "bonus on output" is a term which does not meet with the approval of the official representatives of the operatives whom I frequently meet; the term is repeatedly coupled with "piecework." Piecework, in the old application of the term, has been condemned by all federated builders, but I am not so sure that it is not widely practised at the present time by non-federated builders and even some trade union members. But "bonus on output," where an operative is assured of the standard rate whenever employed, with an additional bonus as the result of extra skill and energy, surely can have no logical condemnation.

As employers, we claim that a man should give a fair day's output for a fair day's wage, and the fair wage is that which is fixed by employers and operatives as the standard wage. The progress of the world has been brought about by the enterprise, industry and self-sacrifice of the individual, and the reward of merit has gone to those who have been prepared to practise those qualities. I have said before that I know of no force which has been greater in undermining the character and success of the individual than the system of paying all alike an equal amount without any regard to the value given in output. Work is going to be the one factor above all others to redeem this old country of ours from the slough into which it has drifted. Work is the greatest, if not the only, blessing inherited from the exodus from Eden—work, which will help one over one's troubles, improve one's health, and, if pursued with interest and intelligence, will give peace to one's mind and provide for old age.

And then the third section of the industry is that of the operatives. We need a continuance of the harmony in the conduct of our negotiations which we have had in the past. The men need as large a wage at the end of each week to take home to their wives as it is possible to get, and I have suggested how that can be obtained by longer hours and a bonus to those who merit it. They need a continuity of employment as far as that can possibly be obtained, and I have suggested two ways by which that can be met—first, by extra earnings, by bonus on output, which would provide a surplus to carry over unemployed periods should they unfortunately occur; and, secondly, work! Work given at its best will produce more work, because as the best is given so the prices will fall and demand will increase. They also need the recognition of the human factor in their industrial life. The old personal acquaintance (and often friendship) and contact with the employer has, to a large extent, been lost, and its revival can only be productive of good to all concerned. It is an acknowledged fact that the old theory that less work done individually will give employment to greater numbers has proved a complete fallacy; whereas more work given by the individual in return for the payment received has produced a reduction in cost which has created an increased demand, which gives greater employment.

They seek a solution of the difficulty occasioned by time lost through stress of weather, and this is now occupying the careful consideration of both sides, and I hope a solution will be found without creating a further burden on the industry.

Space will not permit me to deal with this vast subject in any other than the mere outline that I have been able to give. To all those who may read what I have written I tender my very heartiest good wishes for the year 1923; and of those who may not agree with the opinions I have expressed, I would ask their careful consideration of the points I have raised, as it is only by carefully examining the opinions of those with whom we disagree that sound judgments can be formed and satisfactory decisions reached.

PROSPECTS OF THE BUILDING INDUSTRY.

By R. DUDLEY BARTLETT, MANAGING DIRECTOR, PERRY & Co. (BOW), LTD.

To claim that the building industry has enjoyed, during the universally unfortunate year of 1922, a period of even comparative prosperity, or that it finds itself on the threshold of 1923 in any more robust state of health than one of convalescence, would be to exceed the licence of the most confirmed optimist. It can, however, be said with some assurance that the building trade, dependent though it must be on general industrial conditions, is yet more favourably placed at the present juncture than most of the basic industries.

Perhaps the strongest support for this contention is to be found in the state of the labour market. The inflation of wages and restriction of output that characterised the immediate post-war period are things of the past. Wages are, in fact, at the present moment, at a level beyond which further reductions cannot be contemplated under existing conditions without the risk of hardship for the operatives.

It is not this fact alone which gives cause for satisfaction. The lowering of labour costs was indeed inevitable, but there are grounds for congratulation for all concerned in that the reductions have been effected, while at the same time amicable relations between masters and men have been maintained.

The necessity for mutual sacrifices has been faced in a commendable spirit of fairness. There remains, however, one outstanding subject of controversy upon which an agreement must be reached, if the hardship involved in further reductions in wages is to be avoided. I refer to the 44-hour week. It may not be worth while now to consider how this system came into being. It is, however, certain that the restriction is having a seriously prejudicial effect on the industry.

The question of longer working hours in the summer calls for an early settlement, and if it can be approached in the same attitude of reasonableness and conciliation as obtained during the wages discussion, the extension desired by ninety-five per cent. of employers and, as I believe, by a majority of the operatives themselves, should be secured for 1923.

It may not, perhaps, be inopportune to make some reference here to the question of prices of materials. Without specifying too closely, one may be permitted to suggest that the discrepancy between the reductions in labour and other manufacturing costs and the selling price of certain commodities calls for attention. While the wholesale accusations about "rings" and combines that have been broadcasted during the year may perhaps be taken *cum grano salis*, it is equally certain that free competition, which has shattered price standards in many directions, has not yet exerted its full influence on many essential building supplies.

With regard to housing it is difficult to anticipate what the future holds in store for 1923. The conflicting opinions as to the extent to which the Government are justified in undertaking further assistance show as yet no signs of crystallising into a coherent policy.

The curtailment of the Addison programme, which aroused so much criticism, is shown to be justified in the striking reductions in building costs generally. Sir Charles Ruthen can at least claim that the policy which he initiated has brought a solution of the vexed problem of housing immeasurably nearer to achievement.

To turn from the past to the future, I think that we may confidently look forward to a period, if not of actual prosperity, at least of welcome activity for all concerned in the trade. There are many grounds for this optimism. In the forefront may be placed the feeling of stability which pervades the industry, due to the certain knowledge that building values are now about as advantageous to the owner as they are likely to be for some time to come. In fact, building is once more being regarded as a practical proposition, and, given a reasonable continuation of the trade revival noticeable of late, next Spring should see an expansion of building which will keep the trade as a whole comfortably employed.

Everything depends, of course, upon trade conditions generally. Many signs indicate a steady improvement in 1923. Notably, there are the revival, small though it may be, of shipbuilding, and the strong upward movement of the dollar exchange. Experience has shown that in the train of a movement of this character—usually about six months later—there follows a period of increased activity for British industry.

Reviewing the situation fairly, I feel justified in predicting for the new year a continued trade improvement, from which the building industry stands at the present time in a very favourable position to reap the full benefit.

In conclusion, no review of the prospects of the building trade, however cursory, would be complete without a word about the relations between employers and operatives. That a better feeling exists between them to-day than has been the case for very many years is a fact upon which all may congratulate themselves.

This better feeling can only be the result of one thing, and that is a better understanding of each others aspirations and difficulties. To recognise the value to both sides of a spirit of comradeship is half-way towards attaining it. I would urge all employers to endeavour as a start to get into closer touch with their operatives by what, for want of a better term, is called "welfare work," or by any other means. After all, we are all Englishmen, and one feels that we have only to know and understand each other to enable us to smooth away a great many of the pressing disadvantages of the present state of affairs. We shall make mistakes and we shall have many disappointments, but let us at least try in this New Year to lay the foundation of a happier spirit, for therein lies to a very large extent the future prosperity of our trade itself.

FUTURE POSSIBILITIES OF BUILDING.

By D. G. SOMERVILLE, M.P.

THE conditions in the building trade throughout the country for the last year have been very unsatisfactory, although now showing slight signs of improvement. In the earlier part of the year, the trade was fairly well employed on housing schemes, but labour had not really settled down, and a certain amount of slackness, together with the high prices charged by the merchants, made many of these contracts the reverse of profitable, and a good number of firms did not trouble to tender for new schemes.

The labour conditions have, however, become much more settled and, in fact, I do not think that in any trade the men have accepted bigger reductions in their wages without serious trouble. There is now no doubt that every class of tradesman are now putting their backs into the work and the output per man is practically what it was in pre-war days, and there is certainly not more than a fair wage being paid in view of the still high cost of living.

With regard to the prices of building materials, while these have come down very considerably, I am of the opinion that prices are still too high and that they have got to come down still further to correspond to the level of wages being paid. Apart from this, I do not anticipate any considerable fall in building costs, and think that prices are now pretty well stabilised and building owners need have very little fear that, by letting contracts just now, they will lose anything really worth considering.

With reference to the prospects of the trade, I consider these are much more promising, as there is undoubtedly a better feeling all round, and most building owners consider that under the present Government they will, at any rate, be let alone to develop on the lines they consider will be the most profitable. Many architects tell me that they have numerous commissions under consideration, and, should nothing unforeseen occur to upset the course of business, these commissions will undoubtedly mature in the New Year.

A somewhat false impression as to the prosperity of the building trade may be caused in London by the amount of building which is being carried on, especially in the West End and City. In nearly every case, the rebuilding in question is not being carried on to what one might call the building owners' or tenants' actual requirements, but because a very large number of leases have fallen in and new buildings have had to be re-erected in order to secure a new lease. In a good many cases, the contractors are actually financing the new building operations, which, I think, says a great deal for the strong position in which the building trade finds itself after the very difficult times it has had to go through during the last few years.

I consider, generally, that it is a very good omen for the future that the building trade has come through the difficulties of the after-war slump in the way it has done, and it follows that the firms who are still doing work are of the most efficient and financially sound character. The relationship between men and masters is also now of the best possible character, and I think that, unless some serious development occurs abroad over the reparations question, &c., the building and contracting trades may look forward to a steady recovery, if not a really prosperous year which, in my opinion, is quite on the boards.

A NEW YEAR'S MESSAGE.

By THOMAS FOSTER.

YOU ask for some message for the New Year number of *The Builder*. What can one say? It is the season when pleasant things, usually, are said; when men express good will, and hope for a better time in the future than the past has been. One used to think that these expressions in some way indicated an intention to let good will operate, and hopes be realised. But as one gets older disillusion comes, and we realise that in these things man is very much as usual—if anything, more so.

Not long ago this nation found itself in a very tight place and began to wonder whether it could extricate itself. Like individuals at some critical periods in their lives, conscience awoke to a sense of past shortcomings, and in no direction seemed more contrite than in thinking about the way in which the poorer and more numerous section of the community had been treated. This section had rallied in a surprising way to help the country in its hour of need, and out of gratitude those who had most of this world's gear to lose vowed that their poorer brethren should have a better share of the England which was to be when the danger was overcome. Like a celebrated potentate of old, when the immediate danger was past, they have, apparently, forgotten their vows and hardened their hearts. In spite of the seasonal hopes and expressions of good will, there seems to be little evidence of any determination to translate them into reality.

What, you ask, has this got to do with the community within a larger community with which *The Builder* is primarily concerned? During the war, and since, the building industry has, in the main, avoided open strife; and superficial thinkers have brought themselves to believe that the material out of which open strife develops is non-existent. It is no use trying to keep up the illusion of such a fool's paradise. The fact is that, roughly, all industry is divided into two more or less hostile camps. The easy-going thinkers on both sides try to persuade themselves, and others, that in reality the strife does not exist—that the interests of the two sides are identical. Would that they were! Those engaged in the building industry are no exceptions in this vital matter. Its employers are aligned with other employers, and its operatives with the rest of labour everywhere.

The immediate question is, what are our employers going to do about it? They occupy the position of advantage due to the possession of material wealth, economic security, and social position. They have the correspondingly

greater responsibility, and obligation to the community. Only too readily they try to put the blame for present-day troubles on the shoulders of the working class, who might seem to be cursed with a double dose of original sin. I do not seek to minimise their share of responsibility. As a matter of fact, no one group, either employers or employed, is solely responsible for bringing about the evil state in which we find ourselves—but society as a whole.

Expressions of good will do not carry us far. Some hard thinking is necessary, and the sacrifice of many preconceived opinions; and as we generally prefer the line of least resistance, we funk our duty, especially when we vaguely realise that it may mean some material sacrifice on our part.

A great responsibility rests upon the employers in the building industry, for they have deliberately scrapped machinery that had been set up to provide for the examination of social and economic problems which they supposed did not matter. What are they going to put in its stead? If they are not prepared to take their place in social and industrial reconstruction it will not be long before society has no use for them. I know that many of them will not be grateful to me for advancing these views, but the views put forward are the truth of the matter as I see it; and as they are the outcome of a comparison of the views of many great thinkers and teachers, past and contemporary, I advance them in the hope that the New Year may, in some way, provide opportunities for their discussion in an atmosphere of real good will.

WAGES ON PUBLIC WORKS.

THE Public Works Conciliation Board has decided that the present rate of wages ("X" in the schedule) for the City and County of London remain at 1s. 4d., and that the rate for the area beyond the City and County of London and to the limits of the Metropolitan Police Area be not more than 1d. less than the "X" rate in the City and County of London. This is to be effective for the three months, January, February and March, 1923. In the following schedule the labourers' rate equals "X"; for the City and County of London the labourers' rate is 1s. 4d.:—

Trade.	Plus Rate.
Blacksmith	X plus 4½ pence
Concrete Leveller	X „ —
Duct or Earthenware Drain Layer	X „ 1 „
Fitter	X „ 4½ „
Granite Mason Kerb, &c. ..	X „ 5½ „
Granite Sett Dresser ..	X „ 4½ „
Jointer	X „ 1 „
Kerb Fixer	X „ 4½ „
Pavior	X „ 4½ „
Petrol Locomotive or Roller Driver	X „ 2 „
Platelayer	X „ 1 to 2 pence
„ Labourer ..	X „ —
Pneumatic Pick Operator ..	X „ 1 pence
Rammerman	X „ 1 „
Scaffolder	X „ 3 „
Screeder	X „ 1 „
Steam Roller Driver ..	X „ 4 „
Street Mason and Flag Dresser	X „ 4½ „
Tarpot Man	X „ —
Timberman	X „ 1 „
Wood Block Layer ..	X „ 1 „
Watchman	X 7s. 6d.*

* Minimum day or night.

Men working in "boots" 1d. per hour extra. Workmen working in dirty or dangerous places subject to special rates and conditions. Boys 14 to 16 years, ¼ of X; 16 to 18 years, ½ of X; 18 to 20 years, ¾ of X. The hours of labour and overtime rates to remain as agreed on March 11, 1920.

Obituary.

The death occurred recently of Mr. Joseph Hodsman, joiner and builder, 34, Lower Eldon-street, York.

COMPARISON OF PRICES OF BUILDING MATERIALS IN JANUARY, 1922, WITH CURRENT PRICES.

WE again have pleasure in publishing a table giving the prices of the principal building materials at the present time as compared with the prices for January, 1922. We are glad to say that there has been a steady fall in nearly all the markets.

Material.	Jan., 1922. £ s. d.	Jan., 1923. £ s. d.	Fall %	Rise %
Bricks—				
Best Stocks	4 13 0	4 2 0	11.83	—
Flettons	3 12 0	3 1 0	15.28	—
Glazed	26 0 0	22 0 0	15.38	—
Thames ballast	0 14 0	0 13 6	3.57	—
Thames sand	0 19 0	0 16 6	13.16	—
Shingle (¾ in.)	0 19 0	0 14 0	26.32	—
Portland cement	3 17 6	3 3 0	18.71	—
Ground blue lias lime (at railway depôt)	2 12 0	2 1 6	20.19	—
Grey stone lime	3 5 0	2 16 6	13.08	—
Bath stone	0 3 2¾	0 2 11	9.68	—
Portland stone	0 4 11½	0 4 7	7.56	—
Good Sound Building Timber—				
4 in. × 11 in.	36 0 0	34 0 0	5.55	—
3 in. × 7 in.	25 0 0	22 10 0	10.00	—
3 in. × 11 in.	34 0 0	32 10 0	4.41	—
2 in. × 11 in.	32 0 0	32 10 0	—	1.56
2 in. × 7 in.	23 0 0	22 10 0	2.17	—
3 in. × 4 in.	20 10 0	21 0 0	—	2.44
Slates—				
24 in. × 12 in.	46 10 0	41 17 0	10.00	—
22 in. × 12 in.	42 5 0	38 0 6	10.00	—
R.S. joists	14 10 0	13 0 0	10.34	—
Iron—				
Common bars	15 0 0	12 10 0	16.66	—
Mild steel bars	13 10 0	12 0 0	11.11	—
Steel bars	13 10 0	12 0 0	11.11	—
Cut nails	26 0 0	21 10 0	17.31	—
Sheet lead	36 0 0	35 10 0	1.39	—
Glass—				
15 oz. sheet	0 0 4¼	0 0 2¾	35.29	—
21 oz. sheet	0 0 6¼	0 0 4⅝	26.00	—
26 oz. sheet	0 0 7¼	0 0 5¼	20.70	—
Raw linseed oil	0 3 2	0 3 7	—	13.16
Turpentine	0 6 1	0 8 9	—	43.84
Ground English white lead	58 0 0	55 5 0	4.74	—
White lead paint	77 5 0	77 10 0	—	0.32
Red lead	41 0 0	39 0 0	4.88	—

THE BUILDING TRADES PARLIAMENT.

WE have received the following from Mr. J. E. Yerbury, Lic.R.I B.A.:—

SIR,—In your issue for December 29, the Editorial and Organising Secretary of the National Federation of Building Trades' Employers writes that it is "arrant nonsense" to say that the Building Trades Parliament should come to life again and continue its work on the lines of the Foster Report. Is this the considered judgment of the N.F.B.T.E., or only the expression of a personal opinion?

Another statement he makes is that the employers withdrew from the Industrial Council, certainly never to return while the memory of the Foster Committee Report remains; one would like to know whether this is only a statement of the Editorial and Organising Secretary's belief, or an ultimatum from the N.F.B.T.E. Is it really "arrant nonsense" to hope for a Building Trades Parliament, "the keynote of which shall be the 'team spirit' in industry sounding across the whole industrial arena the trumpet-call of a new idea?"

Your correspondent writes with confidence—and should know the facts—and he says it is "arrant nonsense" because the Foster Committee Report killed the Building Trades Parliament by showing "the cloven hoof of socialism." That dear old bogy! I wonder the Editorial Secretary didn't rise to Bolshevism! What is socialism? It seems the fashion with frightened politicians to call anything they don't like "socialism," and everything that frightens them "Bolshevism." If the spirit of the Foster Report is the spirit of socialism, it seems to me the sooner we all embrace it the better. Let me quote from its sponsors:—"The incentive which took our men to France to die was service—not gain. Gain was not the real incentive to effort; there was another and greater incentive, and that was service. Service was the whole spirit of the Christian ethic, and was also proved to be the only sound economy." These are the expressions of the views of those who signed the Foster Report, and somehow, even when the Editorial Secretary of an Employers' Federation calls it "arrant nonsense," one can't help wishing to see the revival of such socialism, although it may have two, four, or a great many more cloven feet.

Personally, I do not care very much what the policy is called if it is good, and the avowed policy of the Foster Committee's Report was founded on the conception of our industry as a great self-governing democracy of organised public service, giving "freedom and security" for initiative and enterprise; complete removal of the fear of unemployment; salaries to management commensurate with ability; hire of capital at the market rate of good securities, and provision of common service controlled by the whole industry and financed from its surplus earnings. The Foster Committee made a great step forward, and I for one trust the Secretary of the N.F.B.T.E. is not expressing the opinion of the Federation when he says its work is dead and damned.

NEW BUILDINGS IN LONDON.

WALHAM GREEN.—The latest block of artisans' dwellings to be erected by the Samuel Lewis Trust, at Walham Green, comprises 356 tenements. They are all self-contained, each tenement being provided with separate bathroom, water closet and kitchen, in addition to the bedrooms. There are 18 blocks in all, which are arranged round central courtyards in which there are shelters. The tenements themselves are arranged with one bedroom, two bedrooms, three bedrooms, and four bedrooms. The elevations are of a pleasing design, and are constructed with Crowborough base and red heather facings above the ground floor, the arches being constructed of tiles. The floors are of Kleine construction throughout; and the walls of the staircases, kitchens, sculleries, bathrooms, and w.c.'s, are tiled to the full height. There are several features of interest in the buildings, the most notable being the serving hatch between the kitchen and sitting room, fitted up with shelves and a cupboard to save labour. Hot water is provided to every bath from a copper adjacent thereto, and operated by a patent three-way valve. Drying rooms, pram sheds and bicycle sheds have also been provided. The cost of the buildings will be about £250,000. The architects are Messrs. Joseph, 2, Paul's Bakehouse-court, Godliman-street, E.C. 4; and the contractors are Messrs. Higgs & Hill, Crown Works, South Lambeth-road, S.W. 8. The following are the sub-contractors: Messrs. Stuart's Granolithic Co., 63, Lincoln's Inn-fields, W.C., granolithic paving; Messrs. Pilkington's Tile & Pottery Co., 37, Shoe-lane, E.C., and Messrs. Carter & Co., 29, Albert-embankment, S.E., tiling; The Ragusa Asphalte Co., 25–27, Oxford-street, W., asphalte; Messrs. J. H. Nicholson & Co., 95, Southwark Bridge-road, S.E. 1., heating; Messrs The Carron Co., 15, Upper Thames-street, E.C. 4, ranges, baths, stoves, rain-water and soil goods; Messrs. Jones & Campbell, Torwood Foundry, Larbert, Stirlingshire, coppers; Messrs. Broad & Co., South Wharf, Paddington, drainage goods; Mr. George Messent, Beresford-street, S.E., blinds; Messrs. Bolding & Sons, Davies-street, W., sanitary apparatus; Messrs. The Crittall Manufacturing Co., 246, High Holborn, W.C., casements; Mr. F. H. Wheeler, 39, Victoria-street, Westminster, S.W. 1, electric light; and Messrs. Marbello, Ltd., Crescent Wharf, Birmingham, composition flooring.

STRAND.—The premises which stand on a site formerly occupied by "The Three Crowns," at the corner of Bedford-street and King-street, have recently been acquired by Messrs. Moss Bros., for extending and connecting up their premises on either side. Alterations have been carried out, including the removal of the ground floor front wall and new shop fronts. An interesting feature of the work was the shoring up of a circular corner of about 20 ft. radius, containing two brick piers and chimney breasts, weighing approximately 80 tons each, for the insertion of steel columns. This entailed tying in the front with strong steel ties to prevent outward movement, and necessitated an elaborate system of raking shores and struts, the work being carried out without the slightest disturbance to the superstructure. The internal portion has undergone a complete change, a staircase with elaborately carved balustrading and newel finishings having been fixed, and the sanitary accommodation having been re-arranged throughout. Much has also been added to make the lower portion into a shop for Messrs. Moss Bros., Ltd. The street fronts of the building, which is about fifty years old, have been successfully treated by the steam-cleaning process, so that they present the appearance of a new building. The work has been carried out under the superintendence of Messrs. Higgins & Thomerson, Lic.R.I.B.A., M.I.Struct.E., of 9, Finsbury-square, E.C., by the general contractors, Messrs. Walter Lawrence & Sons, Ltd., of 19, Finsbury-square, E.C. The steelwork was executed by the Aston Construction Co.; and the shop fronts by Messrs. Shannon, Ltd.

WHITEHALL.—There is an unofficial proposal for the construction of a subway from Whitehall-gardens to the House of Commons, with branches to Downing-street, King Charles-street, and to Victoria-street, according to the *Evening News*. The idea is that it would connect Government departments as well, and link them with the Houses of Parliament.

WESTMINSTER.—Specifications are now being prepared by the London County Council for the construction of the great concrete raft on which the final section of the new County Hall will stand, says the *Evening News*. About one-fifth of the building has still to be constructed, and, like all the rest of the building, it will stand on a mass of concrete five feet thick. It will probably be two months before the specifications have been submitted to tender and the Council has accepted the most favourable contract. The work of preparing the site at the northern end of the present building and laying the complete foundation is expected to take about twelve months. Whether or not the Council will then proceed to the completion of the building has not yet been decided.

ST. MARTIN'S-LE-GRAND.—Mr. James White, the financier, is, *The Daily Mail* understands, the principal figure in connection with negotiations for the purchase of the site of the old General Post Office at St. Martin's-le-Grand, E.C. Mr. White, who is stated to be acting on behalf of a syndicate, has, according to a statement made on good authority, paid a large sum as deposit. The agreement, it is understood, has not yet been signed. If Mr. White acquires the property his intention is to dispose of it in plots for building purposes. A number of offers to purchase portions of the site have already been received by Mr. White. One offer concerns a quarter of the whole site, which occupies about 85,200 sq. ft., with a frontage of 525 ft. in St. Martin's-le-Grand, 205 ft. in Gresham-street, and 400 ft. in Foster-lane. This particular offer, it was stated, is connected with "something far more important" than the building of offices.

COVENT-GARDEN.—It is stated that a large site, including Covent-garden Market, has been sold, but we understand that the Covent-garden Estate Co. have no statement to make on the subject, an official saying that he could give no information.

"METRO-LAND."—Mr. H. Gibson, of the Metropolitan Railway Surplus Lands Committee, reports that there has been a fair demand for properties during the past year in the three estates controlled from Baker-street Station, comprising the Metropolitan Railway Surplus Lands, the Metropolitan Railway Country Estates, Ltd., and the Wembley Park Estate Co., Ltd., the total sales for the year amounting to £91,927, made up as follows: Sales of land, £36,132; sales of houses, £28,005; sales of ground rents, £12,840; and shops and business premises, £14,950

MILL HILL.—Messrs. Perry Bros., 36A, The Broadway, Ealing, W.15, are carrying out the erection of a block of shops and flats at Lawrence-street, Mill Hill. Messrs. D. Morris & Sons are the architects.

GRAY'S INN-ROAD.—A garage is being erected by Messrs. W. Daley & Co., 58, Birch-grove, West Acton, W.3. The architects are Messrs. Riley & Glandfield, 6, Raymond's-buildings, Gray's Inn-road.

LONDON MASTER BUILDERS' SPORTS ASSOCIATION.

	P.	W.	L.	D.	Goals. F.	A.	Pts.
Perrycobow ..	5	5	0	0	15	8	10
Minter	2	2	0	0	6	4	4
Trocoll ..	4	2	2	0	7	5	4
Holancube ..	2	1	1	0	4	4	2
Higadillo ..	5	1	4	0	6	12	2
Holloway ..	4	0	4	0	3	8	0

Last Week's results: Minter *v.* Holancube. Abandoned owing to state of ground.

THE POSSIBILITIES OF TOWN PLANNING.

DISCUSSING the subject of "Town Planning" at a junior meeting of the Surveyors' Institution, Westminster, recently, Mr. J. R. Toovey said that, generally, houses should be semi-detached, with a small garden in front (about 15 ft. to 20 ft. long), and a reasonable garden in the rear. It had been suggested that houses of the various classes should be mixed as much as possible, but one was strongly of opinion that it was much more practicable for the several classes to be housed in reasonable groups. With regard to architecture, it would be easy to plan attractive and well-designed "better class" houses, but as to "smaller-class" property, it was much more difficult—that was, if one was to provide reasonable accommodation at an economic rent. But by skilful grouping of simple blocks of houses an impressive design could be planned, which was absent from a scheme in which expensive blocks with broken roofs and numerous gables were used somewhat indiscriminately; the blocks of houses, he suggested, would be best placed when backed by trees, and, therefore, should be on the exterior areas of the district. Where, of course, this type of house must be at important centres or road junctions, it was legitimate to utilise blocks of rather more elaborate design, and they must be contrasted with those of a more simple nature which were carefully grouped along the exterior roads.

As far as possible, towns should be so designed as either to obtain or preserve individuality, and he suggested this might well be done by preserving any object of historic interest and centralising it as much as possible; and much also could be done by keeping informal (natural) beauties as against erecting formal beauties. Much of the unsatisfactory state of housing to-day was due to very rigid by-laws, which had caused great expense in laying down building schemes, such as areas of rooms, window space, sanitary accommodation and connections, laying out width and taking over of roads. But under the present dispensation, if a local authority made a scheme, power was given to override the existing by-laws; and if a corporate body commenced a scheme, a new local authority would probably be formed in which they would have a majority interest and would be enabled so to frame the by-laws as to allow all that was requisite in the whole carrying out of a town-planning scheme.

THE LICENCES AND GENERAL INSURANCE BUILDING.

IN the front of the Licences & General Insurance Co., Moorgate-street (illustrated on p. 17) there are five openings covering the space between three floors, all of which are in ornamental cast leadwork executed by Messrs. H. W. Cashmore & Co., Ltd. The whole of the bays, including the mullions and transoms, are covered in cast sheet lead as well as the ornamental breasts. The scheme was so designed that the use of steel casements would not come in direct contact with the leads, and for this purpose copper sheathing was provided as a preservation against oxidisation by galvanic action. The design also covered inlets for ventilation and for expansion and contraction. The construction upon which the leadwork was built was in wood, which Messrs. Cashmore also provided, and the contract included for the work fixed complete. The firm's contract on the building was for the whole of the ornamental rain-water heads, down pipes and ears, and for the whole of the decorative plasterwork for the general offices and for the board rooms.

Messrs. Marks & O'Donoghue were the architects.

G.W.R. Housing Scheme.

The Great Western Railway Company have decided to apply for powers to facilitate the provision of housing accommodation for persons in their employ, and to enable such persons to acquire such accommodation.

DIARIES & CALENDARS FOR 1923.

AMONG the diaries received we find this year one specially intended for architects and surveyors. This has been compiled and published (price 2s. net), by the Architects' and Surveyors' Assistants' Professional Union, and measures 5½ in. by 3½ in.—a handy size for the pocket. Following a few pages of information usually given in pocket diaries, such as postal rates, a calendar, and spaces for entering engagements, particulars are given of the professional bodies concerned with architecture, surveying, and civil engineering, and the professional training centres and prizes and studentships available to students. The more important publications during the past year are also listed. Among the matters of special interest to those for whom the diary is published are measurement tables and notes on mensuration; a table of areas of circles; weights of various materials used in building and quantities required to cover different areas, &c.; regulations under the Metropolis Water Act, 1871; and fire insurance premiums for different classes of property, &c.

Messrs. Charles Letts & Co. have, as usual, issued a very comprehensive series of diaries, some of the ordinary type, and some for special uses. Among the latter are diaries with features and information specially useful for schoolboys, schoolgirls, Scouts, Guides, gardeners, housewives, poultry keepers, motorists, business men—in fact, there seems to be a diary which will have a special attraction for everyone, whatever his or her occupation or recreation. These diaries are all printed on good paper, well produced and well bound, and vary in size to suit all pockets—and purses! The prices of Letts' diaries, by the way, are almost down to pre-war level. In addition to these pocket diaries, we have also received several of Letts' large-size diaries, suitable for the office table.

The following wall calendars have been sent us:—From Mr. N. Gerver (timber merchant, 204–6, Bethnal Green-road, E.2), a large calendar; from Mr. G. H. Carter (builders and decorators, 108, Hungerford-road, N.7), a small calendar in colours; from Messrs. Hibberd Brothers, Ltd. (joinery manufacturers, 146, Vauxhall-walk, S.E.11), a calendar containing a country scene in colours; from Messrs. Wm. Duncan Tucker & Sons, Ltd. (joinery manufacturers, Lawrence-road, Tottenham, N.15), a wall calendar with changeable cards for each month, day, and date.

Messrs. Edward Wood & Co., Ltd., constructional engineers, of Manchester, have issued a useful pocket diary for 1923, which, in addition to the usual matter contains a great deal of technical information for architects and civil engineers.

A small wall calendar has come to hand from Mr. H. J. Ford, timber merchant and fencing contractor, of Connaught-road, Harlesden, N.W.10.

We have received a copy of the calendar issued by Messrs. Ruston & Hornsby, Ltd., Lincoln. The firm will be pleased to send a copy to readers who care to make application.

We have also received calendars from Messrs. Griggs & Son, 100, Victoria-street, Westminster, S.W. 1; Messrs. Tuke & Bell, Ltd., 27, Lincoln's Inn Fields, W.C. 2.

The Federated Builders' Diary and Year Book, published by the Southern Counties Federation of Building Trades Employers, and the "Decorators'" Diary and Trade Year Book, issued by the Trade Papers Publishing Co., Ltd., are also to hand.

Builders' Estates.

Mr. Andrew Killby, of Bishopswood-road, Highgate, N., and Worship-street, Finsbury, E.C., builder, left estate value £18,553.

Mr. Thomas Webber Rhodes, of Fairholt-road, Stoke Newington, N., builder and house decorator, left estate valued at £1,793.

Mr. John Carrick, of Crossgate, Durham, retired builder, left estate value £10,574.

RATES OF WAGES IN THE BUILDING TRADE.

The following are the rates of wages in the building trade in England and Wales. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur:—

	Masons	Bricklayers.	Carpenters, Joiners.	Plasterers	Slaters.	Plumbers	Painters	Masons' Labourers.	Bricklayers' Labourers.	Plasterers' Labourers.
Aberdare	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Accrington	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Altrincham	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Ashton-under-Lyne	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Barnsley	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Barrow-in-Furness	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Barry	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bath	1/5	1/5	1/5	1/5	1/5	1/5	1/5			1/0½
Bedford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Birkenhead	1/9	1/9	1/9	1/9	1/9	1/10	1/9			1/4½
Birmingham	1/8	1/8	1/8	1/8	1/8	1/9	1/8			1/3
Bishop Auckland	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Blackburn	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Blackpool	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bolton	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bournemouth	1/4½	1/4½	1/4½	1/4½	1/4½	1/5½	1/4½			1/0½
Bradford	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Bridgwater	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½			0/11½
Brighton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Bristol	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Burnley	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Burton-on-Trent	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Bury	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Cambridge	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Cardiff	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Chatham	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Chelmsford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Cheltenham	1/5	1/5	1/5	1/5	1/5	1/5	1/5			1/0½
Chester	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Chesterfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Colchester	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Coventry	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Crewe	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Darlington	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Derby	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Doncaster	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Dudley	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Durham	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
E. Glam. (Mon. Vall.)	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Eastbourne	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Exeter	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Folkestone	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Gloucester	1/5	1/5	1/5	1/5	1/5	1/5	1/4			1/0½
Grantham	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Grays	1/8	1/8	1/8	1/8	1/8	1/8½	1/7			1/3
Grimsby	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Great Yarmouth	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Guildford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/5½			1/0½
Halifax	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Harrogate	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Hartlepools	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Hastings	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Hereford	1/5	1/5	1/5	1/5	1/5	1/5	1/4			1/0½
Huddersfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Hull	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Ipswich	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Lancaster	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Leamington Spa	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Leeds	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Leicester	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Lichfield	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Lincoln	1/3	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Liverpool	2/9	1/9	1/9	1/9	1/9	1/10	1/9			1/4½
Llanelly	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
London	1/8	1/8	1/8	1/8	1/8	1/8½	1/7			1/3
Loughborough	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Luton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Maidstone	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Manchester	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Mansfield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Merthyr Tydfil	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Middlesbrough	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Newcastle-on-Tyne	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Newport, Mon.	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Northampton	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Norwich	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Nottingham	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Oakham	1/5	1/5	1/5	1/5	1/5	1/5	1/5			1/0½
Oldham	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Oxford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Plymouth	1/6	1/6	1/6	1/6	1/6	1/6	1/5			1/1½
Pontypridd	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Portsmouth	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Preston	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Reading	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Rochdale	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Rochester	1/4	1/4	1/4	1/4	1/4	1/4	1/4			1/0
Rugby	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
St. Albans	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
St. Helen's	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Scarborough	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Sheffield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/4
Shrewsbury	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Southampton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Southend-on-Sea	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Southport	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
South Shields	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Stockport	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Stockton-on-Tees	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Stoke-on Trent	1/8	1/8	1/8	1/8	1/8	1/9	1/8			1/0½
Stroud	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4			1/0
Sunderland	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Swansea	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Swindon	1/5	1/5	1/5	1/5	1/5	1/5	1/4			1/0½
Taunton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Torquay	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Tunbridge Wells	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Wakefield	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Walsall	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
Warrington	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
West Bromwich	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Wigan	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Windsor	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½			1/0½
Wolverhampton	1/8	1/8	1/8	1/8	1/8	1/8	1/8			1/3
Worcester	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2
York	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½			1/2

(For rates of wages in the Building Trade in Scotland, see page 62.)

CONTRACTS, COMPETITIONS, &c.

For some contracts still open, but not included in this List, see previous issues. Those with an asterisk are advertised in this number. Certain conditions beyond those given in the following information are imposed in some cases, such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in; the name and address at the end is the person from whom or place where quantities, forms of tender, &c., may be obtained.

BUILDING AND PAINTING.

JANUARY 8.—**Birmingham.**—LAUNDRY.—For erection of central establishment laundry at Woodcock-street, for the T.C. Mr. A. McKewan, architect, King's-court, 115, Colmore-road, Birmingham. Deposit £2.

JANUARY 8.—**Church Village and Beddau (Glam).**—REBUILDING.—For rebuilding the Cross Inn, Church Village, and the Gelynog Inn, Beddau, for the Rhondda Valleys and Ely Breweries, Ltd. Application for details, with deposit of two guineas, to be made not later than December 18, to Secretary, Rhondda Valleys and Ely Breweries, Ltd., Taff-street, Pontypridd.

JANUARY 8.—**Glasgow.**—PAVILION.—Erection of pavilion for Nether Pollok Playing Field, Haggs-road, Pollokshaws, for the Education Authority. Education Offices (Property Department), 129, Bath-street, Glasgow. Deposit £1 1s.

JANUARY 8.—**Saltcoats.**—HOUSES.—For the various works in connection with the erection of 10 additional houses on the site adjoining Jacks-road, Saltcoats. Mr. James Campbell, Town Clerk. Deposit £1.

✱JANUARY 9.—**Birmingham.**—HOUSES.—Erection of 212 non-parlour type houses on the Billesley House Estate, Yardley Wood, to be let in five contracts. Mr. Herbert H. Humphries, M.Inst.C.E., City Engineer and Surveyor and Executive Officer for Housing Scheme, City of Birmingham, The Council House, Birmingham. Deposit £1 in respect of each contract.

JANUARY 10.—**Cashel.**—HOUSES.—Erection of four houses, for the U.D.C. Mr. John Maher, Clerk, 2, John-street, Cashel. Deposit £2 2s.

JANUARY 10.—**Darlington.**—HOUSES.—Erection of 25 houses on the Cockerton site, for the T.C. Mr. George Winter, Borough Surveyor, Town Hall, Darlington.

JANUARY 10.—**East Coker.**—BUNGALOW.—Erection of bungalow at Primrose-hill, for Mr. A. M. Millerd. Mr. A. J. B. Abbott, architect, Yeovil.

✱JANUARY 10.—**Hertfordshire.**—EXTENSION.—Erection of an extension to the High School for Girls at Bishop's Stortford, for the County Council Architect, Mr. J. W. Fisher, of Messrs. Talbot Brown & Fisher, Architects, Burystead-place, Wellingborough. Deposit £2 2s.

JANUARY 10.—**Littlehampton.**—PAVILION.—Erection of a pavilion, &c., at the Playing Field in Maltravers-road, for the U.D.C. Mr. Arthur Shelley, Clerk, Littlehampton.

JANUARY 10.—**Neath.**—HOUSES.—For the erection of eight houses at Crythan Park site, for the B.C. The Borough Engineer, Gwyn Hall, Neath. Deposit £2 2s.

JANUARY 10.—**Walton-on-Thames.**—EXTENSIONS.—Construction of the superstructure for the extension of the existing engine house, boiler house, elevated coal bunkers, and alterations to existing works, &c., to the pumping station at Walton-on-Thames, in the County of Surrey, for the Metropolitan Water Board. Chief Engineer, Office of the Board (Room 201), New River Head, 173, Rosebery-avenue, E.C.1. Deposit £5.

JANUARY 11.—**Ardrossan.**—FILTER HOUSE.—Erection of filter house at Millglen Filters, for the T.C. Messrs. T. Kinnear Cook and Robert Wood, Joint Town Clerks, Burgh-chambers, Ardrossan. Deposit £1 1s.

JANUARY 11.—**Cavan.**—CREAMERY.—Erection of new creamery and stores at Ballyconnell, Co. Cavan. Mr. P. J. Brady, C.E., Broomfield House, Ballyhaise.

JANUARY 11.—**Dewsbury.**—PAINTING.—For the cleaning and decorating of the Committee Rooms at the Union Offices, Wellington-street, for the Board of Guardians. Mr. E. T. Tunnicliffe, Clerk, Union Offices, Wellington-street, Dewsbury.

✱JANUARY 11.—**France and Belgium.**—HEADSTONES.—Total supply of 21,000 headstones to be divided into a number of contracts, none of which shall be less than 100 headstones; the headstones are to be made of natural stones. The Secretary, Works Dept., Imperial War Graves Commission, 82, Baker-street, London, W.1.

JANUARY 11.—**Preston.**—ROOF.—Supply and erection of steel roof and covering over the Fish Market, Preston, for the T.C. Borough Surveyor, Town Hall, Preston.

JANUARY 11.—**Warrington.**—GLAZING, &c.—For woodwork and glazing, &c., to new greenhouse at Orford Hall, and for new woodwork and glazing, &c., to greenhouse at Bank Park, for the T.C. Mr. Andrew M. Ker, Borough Engineer, Warrington.

JANUARY 11.—**West Ham.**—CONVENIENCE.—Erection of sanitary convenience, Connaught-road, Silvertown, for the B.C. Borough Engineer, Town Hall, West Ham, E.15. Deposit £1.

JANUARY 12.—**Attleborough.**—REPAIRS.—For adapting and repairing the farm buildings at Haverscroft House Farm, Attleborough, for the Norfolk C.C. Mr. Victor Playle, County Land Agent, Shirehouse, Norwich. Deposit £1 1s.

JANUARY 12.—**Barnsley.**—HOUSE.—For any or the whole of the trades required to be done in the erection of a house on Huddersfield-road, Barnsley. Mr. P. A. Hinchliffe, F.R.I.B.A., 14, Regent-street, Barnsley.

JANUARY 12.—**Dulas.**—BRIDGE.—Erection of a ferro-concrete bridge, at Dulas, near Amlwch, Anglesey, for the Anglesey C.C. Mr. W. E. Jones, County Surveyor, Graig, Llanfair P.G., Anglesey.

JANUARY 12.—**Huddersfield.**—ADDITIONS.—Erection of additions and alterations to the cricket pavilion, Fartown, for the H.C. and A.C. Messrs. J. Berry & Sons, architects, 3, Market-place, Huddersfield.

JANUARY 12.—**York.**—HOUSES.—Erection of 29 houses in 9 separate blocks, at the Heworth Housing Estate, for the T.C. Mr. F. W. Spurr, Architect, Guildhall, York. Deposit £2 2s.

JANUARY 13.—**Tremain.**—HOUSE.—Erection of house.—Mr. D. Davies, "Brynbyfryd," Blaenanerch.

JANUARY 15.—**Denny.**—HOUSES.—For the various works in connection with the erection of 12 houses at the Anderson-street site, for the Burgh of Denny and Dunipace Housing Scheme. Mr. Alexander Hendry, Town Clerk, Town Clerk's Office, Denny.

JANUARY 15.—**Eccles.**—CONVENIENCES.—Alterations and additions to the men's underground convenience and a new underground convenience for ladies at the Market Place, for the T.C. Borough Engineer, Town Hall, Eccles.

JANUARY 15.—**Glasgow.**—GOLF HOUSE.—Erection of golf club house at Littlehill, for the T.C. Office of Public Works, City-chambers, Glasgow.

JANUARY 15.—**Port Talbot.**—CONVENIENCES.—Erection of public conveniences at Aberavon Beach and at Taibach, for the T.C. Borough Engineer, Municipal-buildings, Port Talbot.

JANUARY 15.—**Scotland.**—HOUSES.—Erection for the Board of Agriculture for Scotland of ex-soldier colony houses at the following places:—Damhead Farm, near Loanhead, 32 houses; Boghouse Farm, near Yoker, 7 houses; Grassmylees Farm, Mauchline, 9 houses; Whitemyres Farm, Aberdeen, 10 houses; Scotstoun, Laurencekirk, 4 houses. Board of Agriculture for Scotland, York-buildings, Edinburgh. Deposit £1 1s. each set.

✱JANUARY 15.—**Watford, Herts.**—HOSPITAL.—Erection of Watford and District Peace Memorial Hospital (about 100 beds and administrative quarters). Honorary Treasurer, Lyndale, Upton-road, Watford, Herts.

✱JANUARY 17.—**Ashton-under-Lyne.**—HOUSES.—Erection and completion of 60 Class "A" houses of one type in pairs (being 30 houses for the Corporation of the Borough of Ashton-under-Lyne and 30 Ministry of Health State-aided houses), to be erected on the Heys Estate, off Mossley-road, Ashton-under-Lyne, for the Housing Committee of the Borough. Messrs. W. H. George & Son, architects, 7, Warrington-street, Ashton-under-Lyne. Deposit, £2 2s.

JANUARY 17.—**Bettws.**—ALTERATIONS, &c.—For carrying out improvements, interior reconstruction, new seating, &c., for the C.M. Church, Bettws, for the Trustees. Mr. Robert A. Ford, architect and surveyor, Llanidloes.

JANUARY 17.—**Hammersmith, W.6.**—CONCRETE AND TIMBER CONSTRUCTION.—Construction of an open-air swimming-bath, comprising a concrete swimming pond and timber-framed buildings, for the Metropolitan Borough Council. Borough Engineer and Surveyor, Town Hall, Hammersmith. Deposit £2 2s.

✱JANUARY 19.—**Holloway, London.**—PAINTING, &c.—For internal painting works at the Money Order Office, for the Commissioners of H.M. Works, &c. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W.1. Deposit £1 1s.

JANUARY 19.—**Leeds.**—MARKET EXTENSION.—Extension of the Wholesale Meat Market, Slaughter-house, Lairage, &c., in New York-street, for the T.C. Messrs. Braithwaite & Jackman, 6, South-parade, Leeds. Deposit £2 2s.

JANUARY 19.—**London, E.C.**—REBUILDING.—Rebuilding of the Branch Post Office, Threadneedle-street, E.C., for the Commissioners of His Majesty's Office of Works. Contracts Branch, H.M.O.W., King Charles-street, London, S.W.1. Deposit £1 1s.

✱JANUARY 19.—**London, S.E.**—REBUILDING.—For rebuilding front, &c., of the Postmen's Office, South Norwood, for the Commissioners of H.M. Works, &c. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W.1. Deposit £1 1s.

JANUARY 19.—**Tyne Dock.**—ALTERATIONS.—Alterations to engine shed at Tyne Dock, for the North-Eastern Railway Co. Mr. S. Wilkinson, Architect, Irvine House, Westgate-road, Newcastle-on-Tyne.

JANUARY 20.—**Beaminster.**—HEADQUARTERS.—Erection of infantry headquarters for the Dorset Territorial Army Association. Mr. F. T. Maltey, Architect Dorchester. Deposit £2 2s.

JANUARY 20.—**Rochford.**—BUNGALOWS.—Erection of three pairs of bungalows in the parish of Canewdon. Sanitary Inspector (Mr. A. C. Madge), at Rochford, Essex.

JANUARY 22.—**Fort William.**—HOUSES.—Erection of two blocks (4 houses) at Victoria Park site, for the T.C. Mr. J. G. Falconer, architect, Fort William.

JANUARY 22.—**Salford.**—ALTERATIONS.—Certain alterations at the Union Infirmary, Stott-lane, Pendleton, for the Salford Board of Guardians. Messrs. W. T. Gunson & Son, 10, Marsden-street, Manchester.

JANUARY 23.—**Bath.**—HOUSES.—Erection of 50 houses at Englishcombe Park, for the T.C. Mr. A. J. Taylor, F.S.Arc., 18, New Bond-street, Bath. Deposit £1 1s.

✱JANUARY 24.—**Birmingham.**—FACTORY.—Erection of a P.O. Stores Factory for the Commissioners of H.M. Works, &c. Contracts Branch, H.M. Office of Works, King Charles-street, London, S.W.1. Deposit £1 1s.

JANUARY 25.—**Greenwich.**—BUILDING.—(*a*) Excavation and piling works, (*b*) provision and erection of a steel frame and corrugated iron sheeted building, for the B.C. Borough Engineer, Town Hall, Greenwich. Deposit £2 2s.

✱JANUARY 25.—**Whitstable (Kent).**—HOUSES.—Erection of ten houses, in accordance with drawings and specifications prepared by Mr. A. A. Kemp, 9, Tankerton-terrace, Tankerton, Whitstable, for the U.D.C.

✱JANUARY 26.—**Guildford.**—HOUSES.—Erection of 50 houses on the Guildford Park Housing Estate, for the Corporation. Borough Surveyor, Tuns Gate, Guildford. Deposit £2 2s.

BUILDING TRADE WAGES IN SCOTLAND.*

THE following are the present rates of wages in the building trade in the principal towns of Scotland. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur:—

	Masons.	Bricklayers.	Carpenters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Masons' Bricklayers' Labourers.	Plasterers' Labourers.
Aberdeen	1/7	1/7	1/7	1/7	1/8	1/8½	1/3½	1/- to 1/3	
Airdrie	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Alexandria	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/2	
Arbroath	1/7	1/7	1/7	1/7	1/7	1/7	1/6½	1/1	
Ayr	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Bathgate	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/2	
Blairgowrie	1/7	—	1/7	1/7	1/7	1/7	1/6½	—	
Bo'ness	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/2	
Coatbridge	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Dumbarton	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Dumfries	1/6	1/6	1/6	1/6	1/6	1/8	1/6½	1/2	1/2½ 1/3½
Dundee	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Dunfermline	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/2	
Edinburgh	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Falkirk	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Fort William	1/6	1/6	1/6	1/6	1/6	1/6	1/6½	1/1½	
Galashiels	1/6	1/6	1/6	1/6	1/6	1/6	1/6½	1/1½	
Glasgow	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Greenock	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/1 to 1/3	
Hamilton	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Hawick	1/6	1/6	1/6	1/6	1/8	1/6	1/6½	1/1½	
Helensburgh	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Inverness	1/6½	—	1/6	1/7	1/6½	1/7	1/6½	10d. to 1/2	
Kilmarnock	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Kirkcaldy	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/2	
Kirkwall	1/5	1/5	1/4	1/7	1/5	1/5	1/6½	1/2	
Lanark	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Leith	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/2	
Motherwell	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Perth	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/2	
Stirling	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Stirlingshire (Eastern District)	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	
Wishaw	1/8	1/8	1/8	1/8	1/8	1/8	1/6½	1/3	

* The information given in this table is copyright. The rates of wages in the various towns in England and Wales are given on page 61.

★JANUARY 26.—**Hitchin.**—BRICK ENGINE HOUSE.—Erection of a brick engine house, with machinery, and two reinforced concrete water towers, one of 30,000 gallons and the other of 15,000 gallons capacity. The Clerk, Hitchin R.D.C. Council Offices, Hitchin. Deposit £2 2s.

★JANUARY 30.—**Leyton.**—SCHOOL.—Erection of a school for 400 boys at Canterbury-road, Leyton, E.10, for the Education Committee of the Leyton U.D.C. Mr. John H. Jacques, Lic.R.I.B.A., 61, West Hamlane, Stratford, E.15. Deposit £2.

★JANUARY 30.—**Liverpool.**—TELEPHONE EXCHANGE.—For the erection of the Bank Telephone Exchange for the Commissioners of H.M. Works, &c. Contracts' Branch, H.M. Office of Works, King Charles-street, London, S.W.1. Deposit £1 1s.

JANUARY 31.—**Wolsingham.**—REBUILDING.—Pulling down of two adjoining cottages and rebuilding of the Grey Bull Hotel, Wolsingham, for Messrs. J. W. Cameron & Co. J. W. Cameron & Co., Ltd., 135, Newgate-street, Bishop Auckland. Deposit £2 2s.

NO DATE.—**Batley.**—EXTENSION.—For Batley Technical School extension. Messrs. Walter Hanstock & Son, Architects, Batley.

NO DATE.—**Langland Bay (Glam.).**—ERECTION OF CAFÉ.—For erection of one-story café in extension of the Langland Bay Hotel. Messrs. Thomas & Morgan & Partners, Architects and Surveyors, Pontypridd.

★NO DATE.—**Ripon (Yorkshire).**—REMOVAL, &c.—Taking down and removal of steel-framed concrete huts and reinstatement of the ground in Camps Nos. 21, 22 & 23, at Ripon. Commanding Royal Engineer, R.E. Office, 14, Belle Grove-terrace, Newcastle-on-Tyne.

FURNITURE, MATERIALS, etc.

JANUARY 8.—**Warrington.**—CUBES.—Supply of 100 tons of 4 in. Newry cubes and 100 tons of 4 in. Dalbeattie setts cubes, to the T.C. Mr. Andrew M. Ker, Borough Engineer, Warrington.

JANUARY 9.—**East Hempstead.**—ROAD MATERIALS.—Supply of road materials to the R.D.C. Mr. R. J. Treadwell, Surveyor, Council Offices, Bracknell.

JANUARY 9.—**Redditch.**—FURNITURE.—Furnishing of R.A.O.B. (G.S.B.) "Holmwood" Convalescent Home, Redditch, near Birmingham. Mr. J. G. Blakey, "Holmwood," Redditch.

JANUARY 9.—**Whitchurch.**—GRANITE.—Supply of 2½ in. "Teign Valley" granite, for the R.D.C. Mr. W. J. Hiscox, Surveyor, Winchester-street, Whitchurch, Hants.

JANUARY 10.—**Worthing.**—MATERIALS.—Supply of road materials to the T.C. Borough Surveyor, Municipal Offices, Worthing.

JANUARY 12.—**Dorchester.**—MATERIALS.—Supply of road materials, for the Dorset C.C. Mr. W. T. Fletcher, County Surveyor, Dorchester.

JANUARY 12.—**London.**—MATERIALS.—Supply to the High Commissioner for India of (1) pipes, hose, canvas, burnettized, and screws (delivery); (2) oil, lubricating (G.S.); (5) hammers (pneumatic, Pilkington series, "O" type, or similar); (6) springs (coil, helical and volute). Director-General, India Store Department, Belvedere-road, Lambeth, S.E. 1.

JANUARY 13.—**Driffield.**—ROAD MATERIALS.—Supply of road materials to the R.D.C. Mr. T. C. Beaumont, Surveyor, Driffield.

JANUARY 13.—**Gloucester.**—MATERIALS.—Supply to the C.C. of tar, tar-spraying, oils, and miscellaneous stores. County Surveyor, Shire Hall, Gloucester.

JANUARY 13.—**Hunslet.**—RAW MATERIALS.—Supply of road and paving materials to the R.D.C. Mr. W. B. Pindar, Clerk, Leek-street, Hunslet.

JANUARY 15.—**St. Pancras.**—MATERIALS.—Supply of Yorkshire stone, granite kerbs, paving setts, gravel, lime, cement, bricks, stoneware, pipes, and other glazed goods to the B.C. Mr. E. W. Swinstead, Borough Engineer, Town Hall, Pancras-road, N.W.1.

JANUARY 16.—**Wallasey.**—MATERIALS.—Supply of limestone, granite, cement and concrete flags to the T.C. Mr. W. H. Travers, Borough Engineer, Wallasey.

JANUARY 17.—**Alexandria.**—STORES.—Supply of general stores to the Ports and Lighthouses Administration, Dept. of Overseas Trade, 35, Old Queen-street, S.W.

JANUARY 17.—**Ipswich.**—MATERIALS.—Supply of road and other materials to the East Suffolk C.C. Mr. W. Jervis, County Surveyor, County Hall, Ipswich.

JANUARY 27.—**Chelmsford.**—MATERIALS.—Supply of road materials and oil to the Essex C.C. Mr. Wm. H. Morgan, County Surveyor, Old Court, Chelmsford.

JANUARY 31.—**Canterbury.**—MATERIALS.—Supply of materials to the Roads and Survey Committee. Mr. Philip H. Warwick, City Surveyor, Municipal Buildings, Canterbury.

JANUARY 31.—**Islington.**—STORES.—Supply of stores to the Electricity Department. Electrical Engineer, 60, Eden-grove, Holloway, N.

JANUARY 31.—**Siam.**—RAILWAY STORES.—Supply to the Department of State Railways, Siam, of railway store materials. Messrs. C. P. Sandberg, 40, Grosvenor-gardens, S.W.1. Charge £2 2s.

FEBRUARY 5.—**Calcutta.**—REFLECTORS.—Supply of 500 enamelled steel reflectors, suitable for Parkinson Pattern Lanterns, and 2,000 21 oz. English glass panes, 15 in. square, to the T.C. Superintendent of Stores, Corporation of Calcutta, Central Stores, 149, Lower Circular-road, Calcutta.

NO DATE.—**Kingston-on-Thames.**—MATERIALS.—Supply to the Surrey Education Committee of materials, including school furniture, extension ladders and steps, timber for Woodwork Classes, &c. Mr. W. W. Finny, Secretary, County Education Office, Kingston-upon-Thames.

ENGINEERING, IRON AND STEEL.

JANUARY 8.—**Bollington.**—PIPES.—Supply of about 50 tons of 7 in. cast-iron spigot and socket pipes to the U.D.C. Mr. C. A. Smith, Water Engineer, Council Offices, Bollington.

JANUARY 8.—**Kensington, W.8.**—STEEL AND IRONWORK AND ROOFING MATERIAL.—Provision and erection of the necessary steel and ironwork in connection with a shed for the storage of vans, &c., to be provided by the Council at their Depot in Warwick-road, Kensington; also for the provision and fixing of roofing material required in connection with the said shed for the Royal Borough. Borough Engineer's Department at the Town Hall, Kensington, W.8.

JANUARY 8.—**Leeds.**—ROOF.—Construction of a waterproof reinforced concrete roof for the Service Reservoir in Gipsy-lane, Dewsbury-road, for the T.C. Mr. Charles G. Henzell, Waterworks Engineer, 26, Great George-street, Leeds. Deposit £1.

JANUARY 8.—**New Zealand.**—STEAM HAMMER.—Supply of steam hammer for pile driving, for the Napier Harbour Board. Messrs. W. & A. McArthur, 18, Silk-street, Cripplegate, E.C.

JANUARY 8.—**Southport.**—BRIDGE.—Construction of a new bridge over the London & North Western Railway, near Lloyds Siding, Birkdale, for the T.C. Mr. A. E. Jackson, Borough Engineer, Town Hall, Southport. Deposit £4 4s.

JANUARY 9.—**Manchester.**—TRAMWAY POLES.—Supply to the Tramways Committee of steel tramway poles. Mr. Henry Mattinson, General Manager, Corporation Tramways, 55, Piccadilly, Manchester.

JANUARY 10.—**Middleton.**—PIPES.—Supply of (1) 400 yards of 4 in. socket and spigot cast-iron turned and bored gaspipes in 12 ft. lengths, and (2) specials. Gas Engineer, Gasworks, Middleton.

JANUARY 10.—**Preston.**—COAL HANDLING PLANT.—Supply of coal and ash handling plant for the Ribbie Power Station. Town Clerk, Town Hall, Preston. Deposit £2 2s.

JANUARY 11.—**Bournemouth.**—FENCING.—Erection of wrought iron fencing and gates at Meyrick Park extension, for the T.C. Mr. F. P. Dolamore, Borough Engineer, Bournemouth. Deposit £1 1s.

JANUARY 11.—**Leeds.**—ELECTRIC LIGHTING.—Installing electric light in Blocks 5 and 6 of the Institution, and also the Church and Clock Tower at Beckett-street, for the Board of Guardians. Mr. James H. Ford, Clerk, South Parade, Leeds.

JANUARY 11.—**Manchester.**—PIPES.—Supply of 190 tons of half-turned and bored cast-iron pipes, 6 in. in diameter, and special castings, for the Gas Department. Mr. Godfrey W. Kaye, Secretary, Gas Department, Town Hall, Manchester.

JANUARY 11.—**Walsall.**—ELECTRIC LIGHTING.—Installation of electric lighting at the Union Infirmary, for the Board of Guardians. Mr. A. H. Lewis, Clerk, 29, Leicester-street, Walsall.

JANUARY 12.—**Wolverhampton.**—PIPES.—Supply and fixing of certain piping for coupling-up boilers, feed and other pumps, &c., for the Board of Guardians. Mr. Frank Harrison, Clerk, Poor Law Offices, Wolverhampton. Deposit £3 3s.

JANUARY 15.—**Tilbury.**—DESTRUCTOR.—Construction of refuse destructor, &c., for the U.D.C. Mr. S. A. Hill-Willis, Surveyor, Council Offices, Tilbury. Deposit £1 1s.

JANUARY 16.—**Edinburgh.**—FENCING.—For wrought iron unclimbable hurdle fencing and gates at (1) Comiston-road, (2) Lanark-road, for the T.C. City Road Surveyor, City Chambers, Edinburgh.

JANUARY 16.—**Torquay.**—STEELWORK BUILDING.—Supply and delivery and erection of (a) structural steelwork, and the erection of (b) buildings for their proposed new main sub-station and offices in Lymington-road, Torquay, for the Corporation. Mr. H. F. G. Woods, Borough Electrical Engineer and Manager, Town Hall, Torquay. Deposit £2 2s.

JANUARY 19.—**London.**—RAILWAY STORES.—Supply to the South Indian Railway Co. of: (1) Steel tyres for carriages and wagons; (2) rolled steel disc wheels and axles for carriages and wagons; (3) sheet and plate glass, &c.; (4) Sheffield tools, &c.; (5) locks, &c. Offices, 91, Petty France, Westminster, S.W.1. Charge 5s.

JANUARY 22.—**South Africa.**—SYPHONS.—Supply of 50 4-in. cast-iron automatic sewer flushing syphons to the city of Port Elizabeth. Department of Overseas Trade, 35 Old Queen-street S.W.

JANUARY 25.—**Greenwich.**—REFUSE DISPOSAL PLANT.—(a) The execution of excavation and piling works; (b) the provision and erection of a steel frame and corrugated iron sheeted building in connection with the refuse disposal plant at Tunnel-avenue Depot, for the Metropolitan Borough Council. Borough Engineer and Surveyor's Office, Town Hall, Greenwich. Deposit £2 2s.

★JANUARY 26.—**Hitchin.**—IRON WATER MAIN.—Provision and laying of about 2,740 yards of 3 in., 210 yards of 2 in., cast iron water main, and 1½ in. and ¾ in. galvanised water pipe, in accordance with plans and conditions of contract. The Clerk, Hitchin R.D.C. Offices, Hitchin. Deposit £2 2s.

JANUARY 27.—**Birmingham.**—SALVAGE PLANT.—Supply and erection of plant for refuse destructor and salvage works at Witton, for the T.C. Mr. J. Jackson, Superintendent, 161, Corporation-street, Birmingham. Deposit £1 1s.

JANUARY 30.—**Caerphilly.**—SUPPLY OF MOTOR AND ELECTRIC LIGHT INSTALLATION.—For supply of 5-h.p. motor for a three-manual pipe organ and for complete installation of electric lighting at Vau-road Congregational Church, for the Trustees. Secretary, Vau-road, Congregational Church, Caerphilly.

JANUARY 31.—**Australia.**—ELECTRICAL PLANT.—Supply of steam turbine and other plant to the Morwell Power Station, for the State Electricity Commission. Agent-General for Victoria, Melbourne-place, Strand, W.C. Deposit £2 2s.

FEBRUARY 1.—**Auckland.**—ELECTRIC CRANES.—For the supply of twelve five-ton (alternatively three-ton) semi-portal balanced jib electric quay cranes, four five-ton (alternatively three-ton) balanced jib electric roof cranes, and six one-ton electric monorail cranes, for Auckland Harbour Board. Messrs. W. & A. McArthur, Ltd., 18-19, Silk-street, Cripplegate, London, E.C.2. Deposit £2 2s.

NO DATE.—**Barnsley.**—HEATING APPARATUS.—For the installation of a low-pressure hot-water heating apparatus, in the public hall of the Harvey Institute, Barnsley, for the T.C. Mr. H. Taylor, Borough Surveyor, Fairfield House, Barnsley. Deposit £1 1s.

ROAD, SANITARY, AND WATER WORKS.

JANUARY 8.—**Ardrossan.**—GAS MAIN.—Supplying and laying gas main in Parkhouse-road, for the T.C. Messrs. T. Kinnear Cook and Robert Wood, Joint Town Clerks, Burgh Chambers, Ardrossan. Deposit 10s. 6d.

JANUARY 8.—**Argentine.**—SEWERAGE SYSTEM.—Construction of a sewerage system at Mendoza, for the Department of Sanitary Works, Argentine. Dept. of Overseas Trade, 35, Old Queen-street, S.W.

JANUARY 8.—**Barnsley.**—ROAD.—For the making of and completing two back roads, and also the making of and completing Peel-street, Worsbro' Common, Barnsley. Mr. H. Taylor, Borough Surveyor, Fairfield House, Barnsley.

JANUARY 8.—**Basford.**—ROADS.—Construction of about 100 yds. of new road, for the R.D.C. Mr. Stephen Maylan, Surveyor, Public Offices, Rock House, Basford. Deposit £1 1s.

JANUARY 8.—**Bromley.**—SEWERAGE WORKS.—Laying of about 138 yds. run of 9 in. stoneware pipe sewer in Chelsfield-road, St. Mary Cray, for the R.D.C. Mr. W. J. Winter, Maulden House, Sidcup-hill, Sidcup.

JANUARY 8.—**Finchley.**—ROADS.—For making up several roads, for the U.D.C. Mr. P. T. Harrison, Surveyor, Offices, Church End, Finchley, N.3. Deposit £3.

JANUARY 8.—**Glasgow.**—TENNIS COURTS.—Construction of tennis courts, &c., at Kelvinside, for the Education Authority. Messrs. Crouch & Hogg, C.E., 17, Lynedoch-street, Glasgow. Deposit £1 1s.

JANUARY 8.—**Grimsby.**—SEWERS.—Construction of various sewers, for the T.C. Mr. H. Gilbert Whyatt, 170, Victoria-street, Grimsby. Deposit £2 2s.

JANUARY 8.—**Harrow.**—SEWER.—Laying 192 yards of sewer in Vaughan-road, and 155 yards in Eastcote-lane, for the U.D.C. Mr. J. Percy Bennetts, Surveyor, Harrow.

JANUARY 8.—**Holborn.**—ROADS.—Laying of 10,000 yds. of creosoted deal blocks on new concrete foundation in High Holborn, for the B.C. Mr. E. F. Spurrell, Borough Surveyor, Council Offices, 197, High Holborn, W.C.

JANUARY 8.—**Holywell.**—SEWERAGE WORKS.—Laying 4½ miles of 6 in. and 9 in. dia. stoneware and cast-iron pipe sewers and the construction of a tank sewer, &c., for the U.D.C. Messrs. Williams & Clarke, Civil Engineers, 5 and 6, Godstall-chambers, Chester.

JANUARY 8.—**Horley.**—ROADS.—For paving works, &c., for the U.D.C. Mr. H. N. Royston, Surveyor, Council Offices, Horley. Deposit £2 2s.

JANUARY 8.—**Litherland.**—ROADS.—Reconstruction of part of Bridge-road, off the U.D.C. Mr. G. Ponsford, Surveyor, Council Offices, Sefton-road, Litherland.

JANUARY 8.—**Okehampton.**—WATER MAINS.—Supply and laying of about 1,000 yards of cast-iron socket pipes, for the T.C. Messrs. Nichols & Unwin, 11, Victoria-street, Westminster, S.W.1. Deposit £2.

JANUARY 8.—**Southampton.**—ROADS.—Execution of private street works in Harefield-road, Harrison-road, and Porchester-road (part of), Itchen, for the T.C. Borough Engineer, 33 and 35, French-street, Southampton. Deposit £1 1s.

JANUARY 8.—**Waltham Abbey.**—CEMETERY.—Laying out of a new cemetery of about 4 acres, for the Burial Board. Mr. W. C. Holloway, Surveyor to the Board, Town Hall, Waltham Abbey.

JANUARY 9.—**Belfast.**—PLUMBING.—For the Plumbing work in connection with the new story now being erected on Pavilion No. 3 at Infectious Diseases Hospital, Purdysburn, for the T.C. City Surveyor, Belfast. Deposit £2 2s.

JANUARY 9.—**Bideford.**—SEWERS.—Supplying and laying about 3,500 lin. yds. of 6 in., 4 in., 3 in. and 2 in cast-iron pipes, for the U.D.C. Messrs. St. George-Moore & La Trobe-Bateman, 91, Victoria-street, Westminster, S.W.1. Deposit £1.

JANUARY 9.—**Birmingham.**—SEWERS.—Construction of about 890 yards of brick and concrete sewers, and 620 yards of stoneware pipe sewers, &c., in Edgbaston-road, Russell-road, and Salisbury-road, for the T.C. Mr. Herbert H. Humphries, City Engineer, The Council House, Birmingham. Deposit £2.

JANUARY 9.—**Leeds.**—ROADS.—Paving, concreting, &c., of portions of the highways in Dewsbury-road, Jack-lane, and Stanley-road, for the T.C. Mr. J. B. Hamilton, Commercial Manager, 1, Swinegate, Leeds. Deposit £1 1s.

JANUARY 9.—**London.**—REMOVAL OF ASHES.—For the removal and disposal by barge of ashes from the power station at East Greenwich, for the L.C.C. General Manager, London County Council Tramways, 23, Belvedere-road, Lambeth, S.E.1.

JANUARY 9.—**London.**—SEWER.—Construction in tunnel of an 11 ft. 4 in. internal diameter sewer in iron of a total length of about 1¼ mile, together with outlet to the River Thames, weir chambers, tumbling bays, side entrances, &c., for the L.C.C. Chief Engineer, Old County Hall, Spring-gardens, S.W.1. Deposit £10.

JANUARY 9.—**Neath (Glam.).**—WATER SUPPLY WORKS.—For (a) laying and jointing 6 in. and 3 in. dia. cast-iron pipes (spigot and socket), special castings, the erection and fixing of valves, &c., bridge and stream crossings, valve chambers, excavations, pipe trenches, concreting, &c., as contained along the pipe conduit from the meter-house near the dam of Llwyn Fawt Reservoir to the District Roads, Rhigos, and along district roads of area to main County-road, together with restoration and completion of trench surfaces; approximate lengths of mains, 6 in. 2,070 yds., 3 in. 4,246 yds.; (b) the laying and jointing of 4 in. and 3 in. drain cast-iron pipes, with works similar to contract (a), along the pipe conduit from the Tynewydd Reservoir, Penderyn, toward Hirwain and

Rhigos. Approximate lengths, 4 in. main 417 yds., and 3 in. main 2,385 yds. The cast-iron pipes, special castings, valves, &c., are supplied and delivered to G.W.R. sidings, Hirwain, but contract must include haulage and safe delivery to working sites. The work, for the Neath R.D.C., is all in connection with parish of Rhigos water supply scheme. Mr. D. M. Davies, M.I.M. and Cy.E., Council Offices, Neath.

JANUARY 9.—**Whitchurch (Hants).**—ROADS.—Steam rolling for one year for the R.D.C. Mr. John T. P. Clarke, Clerk, Winchester-street, Whitchurch, Hants.

JANUARY 10.—**Birmingham.**—SEWER.—Construction of sewer in Broad-street, for the T.C. Mr. H. H. Humphries, City Engineer, Birmingham. Deposit £2.

JANUARY 10.—**East Grinstead.**—SEWER.—Construction of sewer in Snow Hill-road, Worth, for the R.D.C. Mr. Charles Turton, Surveyor, 36, High-street, East Grinstead. Deposit £1 1s.

JANUARY 10.—**Galston.**—WATERWORKS.—Laying about 4 miles of cast-iron water pipes, for the T.C. Messrs. Elliott & Brown, engineers, Buxton Buildings, Nottingham. Deposit £2 2s.

JANUARY 10.—**Lanchester.**—SEWER.—Laying of about 220 yards of 9 in. sewer and the construction of tanks, manholes, &c., for the R.D.C. Mr. J. R. Lupton, Surveyor, Lanchester.

JANUARY 10.—**New Mill Scholes.**—ASPHALTING.—Repairs to asphalte playground at New Mill Scholes Council School, for the West Riding E.C. Education Department, County Hall, Wakefield.

JANUARY 10.—**Stainland.**—PLAYGROUNDS.—Repairs to asphalte playgrounds at Stainland Bowling Green Council School, for the West Riding E.C. Education Department, County Hall, Wakefield.

JANUARY 10.—**Wembley.**—SEWERS.—Construction of 2,700 yards lineal of glazed stoneware pipe sewers, at East-lane and Preston-road, for the U.D.C. Mr. Cecil R. W. Chapman, Surveyor, Council Offices, Wembley, Middlesex. Deposit £2 2s.

JANUARY 10.—**Wembley.**—SURFACE WATER SEWERS.—Construction of 2,000 yards lineal of glazed stoneware pipe surface water sewers, at Ealing-road, for the U.D.C. Mr. Cecil R. W. Chapman, Surveyor, Council Offices, Wembley, Middlesex. Deposit £2 2s.

JANUARY 13.—**Perth.**—ROADS.—Re-causewaying with Whinstone setts, portions of the carriageways of Main-street, South-street, and South-street Port, for the T.C. Mr. Thomas M'Laren, Burgh Engineer, Perth. Deposit £1 1s.

JANUARY 15.—**Cardiff.**—ROAD.—Making up of Cardiff and Penarth-road. Mr. E. W. M. Corbett, 3, Castle-street, Cardiff.

JANUARY 15.—**Romford.**—SEWER.—Construction of about 680 yards of 15 in. and 420 yards of 12 in. diameter pipe sewer, &c., in the parish of Wennington, for the R.D.C. Mr. W. J. Grant, Surveyor, 16A, South-street, Romford.

JANUARY 16.—**Barrowford.**—ALTERATIONS TO SEWAGE WORKS.—Alterations and additions at the Sewage Works. (1) Comprises alteration of overflows and additional drains, humus tanks, sludge lagoons, pump-house, and appurtenant works. (2) Comprises sewerage ironwork, including sluice valves, penstocks, floating arms, and appurtenances, for the U.D.C. Messrs. Charles J. Lomax & Son, 37, Cross-street, Manchester. Deposit £3 3s.

JANUARY 16.—**Colwyn Bay.**—SEWERAGE WORKS.—Provision and laying of 8,000 yards of stoneware and cast-iron pipe sewers and rising main; also for the construction of manholes, pumping station, pump well, &c., for the U.D.C. Mr. Robert Green, 37, Benneta-hill, Birmingham. Deposit £5 5s.

JANUARY 16.—**Erith.**—SEWER.—Construction of a sewer in the Erith Marches, &c., for the U.D.C. Surveyor's Office, Bexley-road, Erith. Deposit £1.

JANUARY 16.—**Mitcham.**—ROADS.—Making-up of Jersey-road and Vectis-road, for the U.D.C. Surveyor, Broadway House, London-road, Lower Mitcham.

JANUARY 17.—**Harwich.**—ROADS.—For steam rolling and tar spraying, for the T.C. Mr. F. Harold French, Borough Surveyor, Harwich.

JANUARY 19.—**Beddington.**—ROADS.—Tarspraying 300,000 square yards of roads, for the U.D.C. Mr. S. F. R. Carter, Surveyor, Council Offices, Wallington.

JANUARY 22.—**Wakefield.**—RE-SURFACING.—For remaking and resurfacing of yards at County Hall and Central Stores, for the West Riding C.C. West Riding Architect, County Hall, Wakefield.

JANUARY 24.—**London.**—WATER MAIN.—Construction of water main from Westminster Bridge-road to Vine-street, for the Metropolitan Water Board. Mr. Henry E. Stilgoe, Chief Engineer, 173, Rosebery-avenue, E.C.1. Deposit £20.

JANUARY 27.—**Harrogate.**—SEWERS.—Duplication of two inverted cast-iron syphons on the south main outfall sewer, including the provision and laying of about 816 yards of 21 in. and 902 yards of 24 in. cast-iron pipes, for the T.C. Mr. C. E. Rivers, Borough Engineer, Municipal Offices, Harrogate.

FEBRUARY 1.—**Llanharan (Glam).**—SEWERAGE WORKS AND SEWAGE DISPOSAL WORKS.—For works as follows, for the Cowbridge R.D.C., in connection with the Llanharan Sewerage Scheme: (a) To provide and lay about 2,500 yards of 15 in. dia. cast iron pipe outfall sewers. Lay and provide 600 yds. of 12 in. drain cast iron pipe sewers, with manholes, storm water overflow, ventilating shafts and appurtenant works; and (b) the construction of sewage disposal works consisting of grit-pit, detritus, equalising, storm water, liquefying, and humus tanks, dosing chambers and filters, sludge lagoons, access road, and the building of office and stores and other appurtenant works. Messrs. Thomas & Morgan & Partners, civil engineers, 23, Gellywasted-road, Pontypridd. Deposit £10 10s.

Competitions.

(See Competition News, page 6.)

Auction Sales, Tenders, etc.

★JANUARY 9.—**London, S.W.**—Messrs. Veryard & Yates will sell, without reserve, at 255, Clapham-road, S.W.1, close to the "Swan," Stockwell, stock of useful timber and building materials. Auctioneers, 365, Norwood-road, S.E.27.

★JANUARY 23.—**Bellingdon (Bucks).**—Messrs Frank G. Bowen, Ltd., will sell, at the London Auction (Room M.) 155, Queen Victoria-street, E.C. 4, by order of the mortgagees, the freehold and small part copyhold land, brickworks, buildings and equipment, known as Bellingdon Brickworks, Bellingdon (three miles from Chesham, Bucks), 12 acres, 37 perches. Auctioneers, 62A, Aldersgate-street, E.C. 1.

Public Appointments.

★JANUARY 9.—**Dorset.**—Temporary Architectural Assistant required by the County Council in the County Architect's Department. Small Holdings Equipment. Mr. E. A. Ffooks, Clerk of the County Council, County Offices, Dorchester.

★JANUARY 13.—**Bucks.**—Temporary Junior Assistant required by the County Council. Mr. C. H. Riley, County Architect, Education Sub-Office, Aylesbury.

★JANUARY 15.—**Watford, Herts.**—Clerk of Works required by the Committee of the Watford and District Peace Memorial Hospital. Hon. Treasurer, Lyndale, Upton-road, Watford, Herts.

JANUARY 20.—**Norfolk.**—County Surveyor required for the County of Norfolk. Applicants must have had experience of modern methods of bridge and road making and repairs, maintenance of County Buildings, and the organisation of a Local Road Authority. Mr. H. C. Davies, Clerk to the Council, Shirehall, Norwich.

★NO DATE.—**Siam.**—RESIDENT ENGINEER.—Resident Engineer required by H.M. Office of Works, to take charge of the erection of buildings, including reinforced concrete work, at Bangkok, Siam, extending over a period of possibly two years. Secretary, H.M. Office of Works, Storey's-gate, Westminster, S.W. 1.

TRADE NEWS.

We have received a booklet describing a new type of precision level introduced by Messrs. W. F. Stanley & Co., Ltd., of 286, High Holborn, London, and which embodies several improvements over former types of these instruments, the most important being that the adjustment can be checked instantly at any time and, if necessary, corrected in a few minutes from a single position without the use of any additional apparatus whatsoever.

Boyle's latest patent "Air-Pump" ventilators have been applied to the retort house, Newport (Mon) Gas Co., South Wales. These were supplied by Messrs. Robert Boyle & Son, Holborn Viaduct, London.

Oldham Corporation has placed the work of resurfacing Frederick-street, Werneth, in the hands of Messrs. William Shepherd & Sons, Ltd., Milkstone, Rochdale.

The Walker-Weston Company announce that a further display of their film of the Manchester concrete roads will be given in London at the Gaumont Theatre, 5–6, Sherwood-street, Piccadilly, W., on Tuesday, January 9, at 4.30 p.m. The film has recently been enlarged and now includes a number of new views.

Through a printer's error we regret that the word "Limited" was omitted after the name of Messrs. Bryce, White & Co., Ltd., timber and general merchants, 28, Wharf-road, City-road, N.1, in their half-page advertisement appearing in last week's issue of *The Builder*. The advertisement referred to six designs of gates in three sizes which the firm can supply from stock.

We are informed by Messrs. Jones & Attwood, Ltd., Stourbridge, that Mr. Walter Jones, chairman and joint managing director, has retired from these offices. Mr. E. R. Jones, who became joint managing director with Mr. W. Jones in 1919, will continue in office as managing director, and will act as Chairman of Directors from January 1, 1923.

New Manchester Hotel.

Manchester Corporation Improvements' Committee have decided to recommend the City Council to accept a syndicate's offer of £400,000 for the purchase of Victoria-buildings, which include the Victoria Hotel. Should the Council decide to sell, the syndicate propose to build a large hotel to contain about 700 bedrooms, spacious tea garden and palm court, and one end will be turned into a fashionable shopping arcade.

NEW BUILDINGS IN SCOTLAND.

LONGNIDDRY.—The Presbytery of Haddington has approved of the plans for the erection of a church, hall and manse, at Longniddry, at an estimated cost of about £2,100.

DUNTOCHER.—Plans have been passed for the erection of a new R.C. school in Duntocher, for the Dumbartonshire Education Authority. The school will consist of a two-story building, and will provide accommodation for 600 pupils.

WISHAW.—The Town Council have adopted the recommendation of the Housing Committee for the preparation of a preliminary scheme involving the demolition of 100 houses and erection of 100 two-apartment houses.

AYR.—The Dean of Guild Court have passed plans for buildings, estimated to cost about £7,000, as follows: New hall, with miniature rifle range, at Wellington-square, for the Ayrshire Territorial Force Association, £3,000; bungalow, to be erected by Messrs. J. & D. Meikle, builders, Ayr, at Bellvale-quadrant, £1,450; bungalow, by Mr. Richard Macfarlane, at Robsland-avenue, £1,100; and alterations, at "Stewartlea," Midton-road, by Mr. J. A. Templeton, £1,500.

SELKIRK.—The Lawson Memorial Church have agreed to proceed with the erection of lavatory accommodation outside and inside of the west fabric, and also to provide for a kitchen on the south side of the present session room. The cost of the lavatory accommodation is estimated at about £200.

BUCKIE.—The Banffshire Education Authority are to submit plans for the new secondary school at Buckie to the Scottish Education Department, for approval. The estimated cost is £23,000.

FALKIRK.—The Dean of Guild Court have passed plans for two bungalows, to be erected in Major's-place, at an estimated cost of £2,000. Plans have also been passed for 60 additional houses allotted by the Scottish Board of Health. The houses are to be built on the existing sites—24 at Merchiston, 24 at Carmuirs, and 12 at Thornhill; and will consist of three, four, and five apartment houses. The average cost is stated to be £500. The total expenditure, including the laying out of the necessary streets, will be about £30,000.

EDINBURGH.—The Dean of Guild Court has passed plans for the erection of duty-free warehouses, for the Distillers Co., at Tyncastle, a five-story building, 120 ft. in length by 100 ft. wide; and a villa, for Mr. W. Smith, at Hailesgardens, Colinton.

GLASGOW.—The Dean of Guild Court has passed plans for the erection of a new suite of halls at Wellshot-road. These are intended to form the district public hall for Shettleston and Tollcross. The cost is estimated at £24,520. These are being built for the Corporation Halls Department, in fulfilment of their promise in connection with the extension of the city boundaries. Messrs. George Christie, Ltd., Govan, had plans passed for additions to their works, to cost £7,000. Glasgow Parish Council also had plans passed for additions to Barnhill Poorhouse.

PAISLEY.—The Dean of Guild Court has passed plans for a further development of the Corporation Housing Scheme at Whitehaugh. The plans are for 23 blocks of dwelling-houses, all of the cottage type, and comprising three and four rooms and kitchen. The Council has been considering the demand that exists for tenement houses, but plans for these have not yet been submitted.

BROUGHTY FERRY.—The Dundee Corporation has agreed to build twelve brick houses at Broughty Ferry.

ABERDEEN.—The Corporation has asked the Board of Health to sanction the erection of concrete houses at Torry, at an estimated cost of £500 each.

BRIDGE-OF-WEIR.—The proposal to erect a hall is under consideration.

PRICES CURRENT OF MATERIALS.*

[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry.—Ed.]

BRICKS, &c.

Per 1,000 Alongside, in River Thames up to London Bridge. £ s. d.

Best Stocks 4 2 0
Second Hard Stocks 3 17 0

Per 1000. Delivered at London Goods Stations.

	£ s. d.		£ s. d.
Flettons, at King's Cross	3 1 0	Best Blue Pressed Staffs.	9 11 6
Do. grooved for plaster.....	3 3 0	Do. Bullnose ..	10 1 6
Do. Bullnose ..	3 16 0	Blue Wire Cuts	7 11 6
Best Stourbridge Fire bricks:—			
2½ in.	11 3 0	3 in.	13 2 0

GLAZED BRICKS—

Best White, Ivory, and Salt Glazed Stretchers ..	22 6 0	D'ble Str'tch'rs	30 10 0
		D'ble Headers	27 10 0
		One Side and two Ends ..	31 10 0
Headers.....	21 10 0	Two Sides and one End	32 10 0
Quoins, Bullnose and 4½in. Flats	28 10 0	Splays and Squints.....	30 0 0

Second Quality, £1 per 1,000 less than best. Cream and buff, £2 extra over white. Other colours, Hard Glaze, £5 10s. extra over white.

	s. d.		
Thames Ballast	13 6	per yard,	delivered 2 miles radius Paddington.
Pit Sand	16 0	,, ,,	
Thames Sand	16 6	,, ,,	
Best Washed Sand	16 6	,, ,,	
½ in. Shingle for Ferro-Concrete	14 0	,, ,,	
¼ in ,, ,,	15 0	,, ,,	
¾ in. Broken Brick	10 6	,, ,,	
Pan Breeze	5 6	,, ,,	

Per ton delivered in London area in full van loads.

Best Portland Cement, British Standard Specification Test £3 3 0 £3 8 6
56/– alongside at Vauxhall in 80-ton lots.
Ferrocrete per ton extra on above 10 0
Roman Cement 8 15 0
Parian Cement 5 13 0
Keene's Cement, White 5 13 0
,, ,, Pink 5 8 0
Plaster, Coarse, Pink 3 0 0
,, ,, White 3 12 6
,, Fine 5 12 0
Strapite, Coarse 3 12 0
,, Finish 4 0 0
Grey Stone Lime 2 16 6
Chalk Lime 2 16 6
Best Ground Blue Lias Lime..... 2 18 6
Hair 17 0 0
Granite Chippings 1 12 0

NOTE.—Sacks are charged 1s. 9d. each and credited 1s 6d. if returned in good condition within three months, carr. pd.
Stourbridge Fireclay in s'cks 37a. 6d. per ton at rly. dpt.

STONE.

	s. d.
BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R.. per ft. cube.....	2 11
Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R.. per ft. cube	3 2
Do. do. delivered on road wagons at Nine Elms Depot	3 3
PORTLAND STONE— Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, L. & S.W.R., South Lambeth Station, G.W.R., and Westbourne Park, Paddington, G.W.R., per ft. cube	4 7
Do. do. delivered on road wagons at above stations, per ft. cube..	4 8
White bnsched, 3d. per ft. cube extra. NOTE.—½d. ft. cube extra for every foot over 20 ft. *average*, and ½d. beyond 30 ft.	
YORK STONE, BLUE—*Robin Hood Quality.* Delivered at any Goods Station London.	s. d.
6 in. sawn two sides landings to sizes (under 30 ft. super.) ..... Per Ft. Super	5 3
6 in. rubbed two sides, ditto ..... ,,	5 9
3 in. sawn two sides slabs (random sizes) ,,	2 1½
2 in. to 2½ in. sawn one side slabs (random sizes) ..... ,,	1 5½
1½ in. to 2 in. ditto, ditto ..... ,,	1 3
HARD YORK— Delivered at any Goods Station London.	
Scappled random blocks ..... Per Ft. Cube	5 6
6 in. sawn two sides landing to sizes (under 40ft. super.) ..... Per Ft. Super	5 4½
6 in. rubbed two sides ditto ..... ,,	6 0½
4 in. sawn two sides slabs (random sizes) ,,	2 10
3 in. ditto, ditto ,,	2 5
2 in. self-faced random flags .. Per Yard Super	7 11

ARTIFICIAL STONE.

Delivered in London Area in full van loads.	s. d.	
Plain	8 6	per ft. cube.
Moulded	10 0	,, ,,
Cills	11 0	,, ,,

WOOD.

GOOD BUILDING DEAL.

Inches	per stan.	Inches.	per stan.
4 × 11	.... £34 0	3 × 6	.... £22 10
4 × 9	.... 34 0	3 × 11	.... 32 10
4 × 8	.... 26 0	2 × 11	.... 32 10
4 × 7	.... 24 0	3 × 9	.... 30 0
3 × 8	.... 24 0	2½ × 9	.... 28 0
3 × 7	.... 22 10	3 × 4½	.... 21 0
2½ × 7	.... 22 10	3 × 4	.... 21 0

PLANED BOARDS.

1 × 11	.... 38 10	1 × 9	.... 36 0

PLAIN EDGE FLOORING.

Inches	per sq.	Inches	per sq.
½	20/–	1¼	32/6
¾	22/–	1½	37/6
1	25/–		

WOOD (*Continued*).

TONGUED AND GROOVED FLOORING. Inches	per sq.	MATCHINGS (BEST). Inches	per sq.
1	25/–	½	17/6
1¼	32/6	¾	22/–
1½	37/6	1	25/–

Inches	BATTENS.	s. d.	
½ × 2		2 4	per 100 ft.

SAWN LATHS.

Per bundle			0 2 9	
Dry Wainscot Oak, per ft. super, as inch		0 2 6 to	0 3 0	
½ in. do. do.		0 1 10½ to	0 2 6	
Dry Mahogany—Honduras, Tabasco, African, per ft. super, as inch		0 2 3 to	0 3 0	
Cuba Mahogany		0 3 6 to	0 4 0	
Teak (Rangoon, Moulmein or Java), per load.. ..		45 0 0 to	50 0 0	
American Whitewood planks, per ft. cube ..		0 16 0 to	0 18 0	
Best Scotch Glue, per cwt.		6 15 0 to	—	
Liquid Glue, per cwt.....		4 7 0 to	5 10 0	

SLATES.

1st quality slates from Bangor or Portmadoc in truck loads delivered London area. Per 1,000 of 1,200.

	£ s. d.		£ s. d.
24 by 12	41 17 0	18 by 10	23 12 6
22 by 12	38 0 6	18 by 9	20 16 3
22 by 11	35 2 0	16 by 10	19 16 0
20 by 12	33 8 3	16 by 8	15 8 3
20 by 10	28 11 6		

TILES.

	Per 1,000 f.o.r. London. £ s. d.
Best machine-made tiles from Broseley or Staffordshire district.....	6 0 0
Ditto hand-made ditto.....	6 10 0
Ornamental ditto	6 15 0
Hip and valley tiles (per dozen) { Hand made	0 8 6
Machine made	0 8 0

METALS.

JOISTS, GIRDERS, &c., TO LONDON STATION PER TON—	£ s. d.
R. S. Joists, cut and fitted	13 0 0
Plain Compound Girders	15 0 0
,, ,, Stanchions	17 0 0
In Roof Work	20 0 0

WROUGHT IRON TUBES AND FITTINGS—
(Discount off List for lot of not less than £15 net value delivered direct from Works. 5 per cent. less above gross discounts, carriage forward if sent from London Stocks.)

Tubes, (all sizes).	Fittings, Up to 2".	Fittings, Over 2".	Flanges, Up to 2".	Flanges, Over 2"
Gas ....55 % ..	50 %	55 % ..	60 %	65 %
Water ..50 % ..	45 %	50 % ..	55 %	60 %
Steam ..45 % ..	40 %	45 % ..	50 %	55 %
Galv'd—				
Gas ..45 % ..	42½ %	47½ % ..	52½ %	57½ %
Water 37½ % ..	37½ %	42½ % ..	47½ %	52½ %
Steam 27½ % ..	32½ %	37½ % ..	42½ %	47½ %

L.C.C. COATED SOIL PIPES—London Prices ex works. Bends, stock angles. Branches, stock angles.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6fts plain	3 2½	.. 2 5	.. 2 11
2½ in. ,, ,,	3 9½	.. 2 8	.. 3 8
3 in. ,, ,,	4 5½	.. 2 11	.. 4 4
3½ in. ,, ,,	4 10½	.. 3 8	.. 5 1
4 in. ,, ,,	5 5	.. 4 1	.. 5 10

RAIN-WATER PIPES, &c.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6fts. plain	1 10½	.. 1 4½	.. 1 10½
2½ in. ,, ,,	2 1	.. 1 7½	.. 2 3
3 in. ,, ,,	2 6	.. 2 0	.. 3 0
3½ in. ,, ,,	2 11	.. 2 4½	.. 3 6
4 in. ,, ,,	3 5	.. 2 10½	.. 4 3

L.C.C. DRAIN PIPES.—9 ft. lengths. London Prices per yd.: 4 in., 5/3. .. 5 in., 6/9. .. 6 in., 8/–.

IRON—	Per ton in London. £ s. d.		£ s. d.
Common Bars	12 10 0	to	13 10 0
Staffordshire Crown Bars — good merchant quality	13 10 0	..	14 10 0
Staffordshire "Marked Bars"	16 0 0	..	17 0 0
Mild Steel Bars	12 0 0	..	13 0 0
Steel Bars, Ferro-Concrete quality, basis price ..	12 0 0	..	13 0 0
Hoop Iron, basis price ..	15 0 0	..	16 0 0
,, Galvanised ..	29 0 0	..	31 0 0
Soft Steel Sheets, Black—			
Ordinary sizes to 20 g.	14 0 0	..	15 0 0
,, ,, ,, 24 g.	15 0 0	..	16 0 0
,, ,, ,, 26 g.	16 10 0	..	18 10 0
Sheets Flat Best Soft Steel, C.R. & C.A. quality—			
Ordinary sizes, 6ft. by 2ft. to 3ft. to 20 g.	20 0 0	..	21 0 0
Ordinary sizes, 6ft. by 2ft. to 3ft. to 22 g. and 24 g.....	21 0 0	..	22 0 0
Ordinary sizes, 6ft. by 2ft. to 3ft. to 26 g...	23 0 0	..	25 0 0
Flat and Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 9ft. 20 g.	19 0 0	..	20 0 0
Ordinary sizes, 6ft. to 9ft. 22 g. and 24 g.	19 10 0	..	20 10 0
Ordinary sizes, 6ft. to 9ft. 26 g.	21 10 0	..	22 10 0

METALS (*Continued*).

	Per ton in London. £ s. d.		£ s. d.
Sheets Galvanised Flat, Best quality—			
Best Soft Steel Sheets, 6ft. by 2ft. to 3ft. to 20g. and thicker ..	22 0 0	..	23 0 0
Best Soft Steel Sheets, 22 g. and 24 g.	23 0 0	..	25 0 0
Best Soft Steel Sheets, 26 g.	24 10 0	..	25 10 0
Cut Nails, 3in. to 6in. ..	21 10 0	..	23 0 0

(under 3in. usual trade extras.)

METAL WINDOWS—Standard sizes suitable for complete houses, including all fittings, painting two coats, and delivery to job, average price about 1/4 to 1/7 per foot super.

LEAD, &c.

	Delivered in London. £ s. d.		£ s. d.
LEAD—Sheet, English, 4 lb. and up	35 10 0	..	—
Pipe in coils	36 0 0	..	—
Soil Pipe	38 10 0	..	—
Compo pipe	39 10 0	..	—

NOTE—Country delivery, 30s. per ton extra; lots under 5 cwt., 1s. 6d. per cwt. extra. Cut to sizes, 2s. cwt. extra.

Old lead, ex London area, at Mills ..... per ton	23 10 0	..	—
Do., ex country, carriage forward..... per ton	24 10 0	..	—

COPPER— Strong Sheet ....per lb	0 2 3	..	—
Thin ,, ... ,,	0 2 4	..	—
Copper nails .... ,,	0 2 3	..	—
Copper wire .... ,,	0 2 4	..	—
TIN—English Ingots ,,	0 1 11	..	—
SOLDER—Plumbers' ,,	0 0 11	..	—
Tinmen's ,,	0 1 1	..	—
Blowpipe ,,	0 1 4	..	—

GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES AND IN SQUARES IN ORDINARY SIZES.

	Per Ft.		Per Ft.
15 oz. fourths	2½d.	32 oz. fourths	8½d.
,, thirds	4½d.	,, thirds	10d.
21 ,, fourths	4½d.	Obscured Sheet, 15 oz. 21 ..	3½d. 5½d.
,, thirds	6d.		
26 ,, fourths	5½d.	Fluted 15 oz. 7½d. 21 oz.	9½d.
,, thirds	7½d.	Enfilted 15 ,, 5½d. 21 ,,	7d.

Extra price according to size and substance for squares cut from stock.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	Per Ft.
¼ Rolled plate	4½d.
⅛ Rough rolled	5½d.
⅛ Rough rolled	5½d.
Figured Rolled, Oxford Rolled, Baltic, Oceanic, Arctic, Stippolyte, and small and large Flemish white	6½d.
Ditto, tinted	9d.
Rolled Sheet	6d.
White Rolled Cathedral.....	5½d.
Tinted do.	7½d.

Cast Plate is same price as rough rolled.

PAINTS, &c.

		£ s. d.
Raw Linseed Oil in pipes.....	per gallon	0 3 5
,, ,, ,, in barrels	,,	0 3 7
,, ,, ,, in drums	,,	0 3 10
Boiled ,, ,, in barrels	,,	0 3 11
,, ,, ,, in drums	,,	0 4 1
Turpentine in barrels	,,	0 8 9
,, in drums (10 gall.) ..	,,	0 9 0
Genuine Ground English White Lead, per ton (in not less than 5 cwt. casks.)		55 5 0
GENUINE WHITE LEAD PAINT— "Father Thames," "Nine Elms," "Park," "Supremus" and other best brands (in 14 lb. tins) not less than 5 cwt. lots .....per ton delivered		77 10 0
Red Lead, Dry (packages extra) ..	per ton	39 0 0
Best Linseed Oil Putty	per cwt.	0 16 0
Filocul.....	per cwt.	0 15 6
Size. X D Quality.....	fkn.	0 3 6

VARNISHES, &c.

	Per gallon. £ s. d.
Oak Varnish.....Outside	0 14 0
Fine ditto ..... ditto	0 16 0
Fine Copal ..... ditto	0 18 0
Pale Copal ..... ditto	1 0 0
Pale Copal Carriage ..... ditto	1 4 0
Best ditto ..... ditto	1 12 0
Floor Varnish..... Inside	0 18 0
Fine Pale Paper ..... ditto	0 18 0
Fine Copal Cabinet ..... ditto	1 2 6
Fine Copal flatting ..... ditto	1 0 6
Hard drying Oak ..... ditto	0 18 0
Fine Hard drying Oak ..... ditto	0 19 0
Fine Copal Varnish ..... ditto	1 0 0
Pale ditto ..... ditto	1 2 0
Best ditto ..... ditto	1 12 0
Best Japan Gold Size.....	0 12 0
Best Black Japan	0 12 0
Oak and Mahogany Stain (water)	0 12 0
Brunswick Black	0 9 0
Berlin Black.....	0 14 0
Knotting (patent)	1 5 0
French and Brush Polish	0 17 6
Liquid Dryers in Terebine	0 10 0
Cuirass Black Enamel	0 7 0

* The information given on this page has been specially compiled for THE BUILDER and is copyright. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

CURRENT PRICES FOR BUILDING WORK IN LONDON.*

EXCAVATOR.

		s.	d.
Digging and throwing or wheeling and filling carts, and carting away to shoot—6 ft. deep	per yard cube	15	0
Add if in clay	" "	1	6
Add for every additional depth of 6 ft.	" "	0	9
Planking and strutting to trenches	per foot super	0	7
Do. to sides of excavation, including shoring	" "	1	2

CONCRETOR.

		s.	d.
Portland cement concrete in foundation 1 to 6	per yard cube	40	0
Add if in underpinning in short lengths	" "	9	0
Add if in floors 6 in. thick	" "	3	9
Add if in beams	" "	4	6
Add if aggregate 1 : 2: 4	" "	11	0
Add for hoisting not exceeding 10 ft. beyond the first 10 ft.	" "	3	6

BRICKLAYER.

		£	s.	d.
Reduced brickwork in lime mortar and Fletton bricks	per rod	34	0	0
Add if in stocks	"	8	10	0
Add if in Staffordshire blues	"	24	0	0
Add if in Portland cement and sand	"	3	0	0

FACINGS.

		s.	d.
Extra for facing in English or Flemish bond for every 10s. per 1,000 over the price of the common bricks	per ft. super	0	0	1½

POINTING.

		s.	d.
Neat flat struck or weathered joint	" "	0	0	3

ARCHES.

		s.	d.
Extra only to the price of ordinary brickwork :—			
Fair external in half brick rings	" "	0	0	10
Axed in stocks	" "	0	1	9
Rubbed and gauged jointed in putty camber or segmental	" "	0	6	0

SUNDRIES.

		s.	d.
Damp course in double course of slates breaking joint and bedded in Portland cement	" "	0	1	3
Setting ordinary register grates and stoves	each	1	1	0
Setting kitchener, including forming flues, &c., with all necessary fire bricks	"	5	5	0

ASPHALTER.

		s.	d.
Half-inch horizontal damp course	per yard sup.	7	6
Three-quarter-inch vertical damp course	" "	11	0
¾ inch on flats in two thicknesses	" "	8	6
Angle fillet	per foot run	0	3
Skirting and fillet 6 in. high	" "	1	4

MASON.

		s.	d.
York stone templates fixed	per foot cube	16	3
York stone sills fixed	" "	28	6
Bath stone and all labour fixed	" "	12	0
Portland stone fixed	" "	21	6

SLATER.

		s.	d.
Welsh 16 in. × 8 in. 3 in. lap, including nails	per square	79	9
Do. 20 in. × 10 in. Do. Do.	"	90	9
Do. 24 in. × 12 in. Do. Do.	"	99	0

CARPENTER AND JOINER.

		s.	d.
Fir framed in plates	per foot cube	5	6
Do. joists	" "	6	0
Do. roofs, floors and partitions	" "	6	6
Do. trusses	" "	8	6

		¾"	1"	1¼"	2"
Deal rough close boarding	per sq.	42/-	48/-	56/-	85/-

		s.	d.
Flat centering for concrete floor, including struts or hangers	"	60	0
Do. to beams	per ft. sup.	1	6
Centres for arches	"	2	0
Gutter boards and bearers	"	1	1

FLOORING.		¾"	1"	1¼"	1½"
Deal-edges shot	per sq.		49/-	58/-	67/-
Do. tongued and grooved	"		54/-	65/-	72/-
Do. matchings	"	45/-	55/-		
Moulded skirting, including backings and grounds	per ft. sup.	1/8	2/1	2/3	2/9

SASHES AND FRAMES.

		s.	d.
One-and-a-half moulded sashes or casements	per foot super	1	10
Two Do. Do. Do.	" "	2	3
Add for fitting and fixing	" "	0	6
Deal-cased frames with 1 in. inner and outer linings, 1½ in. pulley stiles tongued to linings, hard wood sills with 2 in. moulded sashes in squares double hung, double hung with pulleys, lines and weights; average size	" "	4	0

DOORS.

		1½"	1¾"	2"
Two-panel square framed	per ft. sup.	2/4	2/7	2/9
Four-panel Do.	"	2/8	3/0	3/3
Two-panel moulded both sides	"	3/0	3/3	3/6
Four-panel Do. Do.	"	3/3	3/7	3/10

CARPENTER AND JOINER—continued.

FRAMES.

		s.	d.
Deal wrot moulded and rebated	per foot cube	14	0

		1"	1¼"	1½"
Plain deal jamb linings framed	per ft. sup.	1/9	1/10	2/1
Deal shelves and bearers	"	1/6	1/8	1/11
Add if cross tongued	"	2d.	2d.	2d.

STAIRCASES.

	1"	1¼"	1½"	2"	2½"
Deal treads and risers in and including rough brackets	2/1	2/4	2/9	—	—
Deal strings wrot on both sides and framed	1/8	2/-	2/2	2/8	—

		s.	d.
Housings for steps and risers	each	0	11
Deal balusters, 1 in. × 1¼ in.	per ft. run.	0	9
Mahogany handrail; average 3 in. × 3 in.	" "	6	0
Add if ramped	" "	11	10
Add if wreathed	" "	23	9

FIXING ONLY IRONMONGERY (INCLUDING SCREWS).

6 in. barrel bolts	8½d.	Rim locks	2/4
Sash fasteners	11½d.	Mortice locks	5/3
Casement fasteners	1/5	Patent spring hinges and letting in to floor and making good	19/-
Casement stays	1/2		
Cupboard locks	1/5		

FOUNDER AND SMITH.

		s.	d.
Rolled steel joists	per cwt.	17	0
Plain compound girders	"	20	0
Do. stanchions	"	23	0
In roof work	"	28	0

RAIN-WATER GOODS.

		3"	4"	5"	6"
Half-round plain rebated joints	ft. run	1/11	2/4½	3/7	4/-
Ogee Do. Do.	"	2/4½	3/1	3/10	4/9
Rain-water pipes with ears	"	2/9	3/7		
Extra for shoes and bends	each	4/4	5/11		
Do. stopped ends	"	1/11	2/4½	3/7	4/-
Do. nozzles for inlets	"	2/2	2/7	3/10	4/3

PLUMBER.

		s.	d.
Milled lead and laying in flashings and gutters	per cwt.	54	0
Do. Do. in flats	"	50	0
Extra labour and solder in coated cesspools	each	7	4
Welt joint	per ft. run.	0	6
Soldered seam	" "	1	10
Copper nailing	" "	0	7

		¼"	⅜"	1"	1¼"	2"	4"
Drawn lead waste	per ft. run	10d.	1/6	1/9	3/1	3/10	
Do. service	"	1/5	1/11	2/3	3/6		
Do. soil	"						6/2
Bends in lead pipe	each					3/3	8/2
Soldered stop ends	"	1/2	1/8	2/1	2/10	3/6	
Red lead joints	"	11d.	1/-	1/3	1/11	2/4	4/10
Wiped soldered joints	"	2/10	3/6	4/-	4/11	6/6	9/9
Lead traps and cleaning screws	"				14/7	19/6	
Bib cocks and joints	"	6/4	9/7	15/4	41/-		
Stop cocks and joints	"	15/4	17/2	25/8	64/-		

PLASTERER.

		s.	d.
Render, float and set in lime and hair	per yard sup.	2	9
Do. Do. Sirapite	" "	2	11
Do. Do. Keen's	" "	4	0
Add sawn lathing	" "	1	7
Add metal lathing	" "	2	10
Portland cement screed	" "	2	1
Do. plain face	" "	3	9
Mouldings in plaster	per 1 girth	0	3
One-and-a-half granolithic pavings	per yard sup.	6	4

GLAZIER.

		s.	d.
21 oz. sheet plain	per foot sup.	1	1
26 oz. Do.	" "	1	4
Obscured sheet	" "	1	8
⅛ in. rolled plate	" "	1	0
¼ in. rough rolled or cast plate	" "	1	1
¼ in. wired cast plate	" "	1	7

PAINTER.

		s.	d.
Preparing with distempering, 2 coats	per yard sup.	1	0
Knotting and priming	" "	0	8
Plain painting 1 coat	" "	0	11
Do. 2 coats	" "	1	7
Do. 3 coats	" "	2	4
Do. 4 coats	" "	3	0
Graining	" "	2	5
Varnishing twice	" "	1	11
Sizing	" "	0	4
Flatting	" "	0	8
Enamel	" "	1	3
Wax polishing	per foot sup.	0	9
French polishing	" "	1	3
Preparing for and hanging paper	per piece	2/- to 4/-	

* These prices apply to new buildings only. They cover superintendence by foreman and carry a profit of 10% on the prime cost without establishment charges. A percentage of 1½ should be added for Employers' Liability and National Health and Unemployment Acts and from 1s. 6d. per £100 for Fire Insurance. The whole of the information given on this page is copyright.

PROPOSED NEW BUILDINGS & OTHER WORKS.*

In these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners commencing work before plans are finally approved by the local authorities, "proposed" works at the time of publication have been actually commenced. Abbreviations:—T.C. for Town Council; U.D.C. for Urban District Council; R.D.C for Rural District Council: E.C. for Education Committee; B.G. for Board of Guardians; L.C.C. for London County Council; B.C. for Borough Council; and P.C. for Parish Council.

ABERDEEN.—Plans passed by T.C.:—Two dwelling-houses, Hammersmith-road, per Mr. George Watt, architect; three garages, Rubislaw Den South, for Messrs. Gray & Kellas, advocates, for Mr. George Watt, architect; petrol storage tank and pump, No. 32, James-street, for William Wisely & Sons, Ltd., carting contractors, per Mr. George Watt, architect; additions to Ferryhill Mills, Albury-road, for Messrs. Patrick Watson & Sons, manufacturers, per Messrs. Wilson & Walker, architects; motor garage, Oakhill-road, for Mr. Marshall K. Watt, chemist; addition to coach-building works, Ashgrove-road, for Mr. William Walker, coach painter, per Mr. George Watt, architect; extension of fish-drying house, Raik-road, for Mr. James M. Davidson, fish merchant, per Messrs. Sutherland & George, architects; alterations at 151, King-street, for the Committee of the Gordon Highlanders' Memorial Club, per Mr. A. H. L. Mackinnon, architect; dwelling-house, King-street (Woodside), for Mr. William Watt, builder.——The Council has passed plans for new streets proposed to be laid out by the City of Aberdeen Land Association at Granitehill.—The Borough Surveyor is authorised to proceed with the extension of Roslin-terrace and the construction of Advocates-road.——The Housing Committee of the Town Council has approved a report by the Deputy Medical Officer of Health, the Sanitary Inspector, and the Director of Housing, providing for the demolition of uninhabitable houses in slum areas, numbering, in all, 1,099, and the erection of 1,120 new houses. The estimated cost is £587,500.

ABERGAVENNY.—The T.C. has decided, at an estimated cost of £1,770 2s. 6d., to lay a bowling green and six tennis courts at Bailey Park.

ABERSYCHAN.—The U.D.C. has decided to approach the County Council for assistance in the building of a new road from Pontywoile to Pontnewydd.

AIRDRIE.—At a meeting of T.C. a discussion took place on a proposal by the Public Health Committee to provide 220 one-room-and-kitchen houses in place of existing one-room houses in slum or insanitary areas, the latter of which are condemned, and also 21 single-apartment houses for aged couples or parties having no family. The Council decided to make application to the Government for a grant in terms of the Committee's proposals.

ALLERSTON.—At a quarterly meeting of the Pickering Wesleyan Circuit it was decided to prepare estimates and go ahead with plans for a new church at Allerston.

AMBLE.—Plan passed by U.D.C.:—Additions, Backfield House, for Mr. Geo. Brown.

BARNSLEY.—Plans have been approved for the erection of a lock-up shop, Rowland-road and Walton-street, Barnsley. The architect is Mr. Geo. Haigh, Harbro' Hill-road, Barnsley.——Plans have been approved for the erection of a lock-up shop, at the junction of Peel-street and Graham's Orchard, Barnsley. The architect is Mr. Campy, of Castleford.——Plans have been approved for the erection of a villa, Salisbury-street, Barnsley. The architect is Mr. W. Storrs, Huddersfield-road, Barnsley.

BASINGSTOKE.—Plans passed by T.C.: Bungalow, Worthing-road, for Mr. E. S. W. Dale; billiards room, lounge, &c., at the Victory Club, New-road, for the Farnham United Breweries, Ltd.; bungalow, Wrinklebury, for Mr. L. G. Neville; additions to Fairhaven, Kempshott Village, for Mr. W. H. E. Willett; drainage at Phœnix Park-terrace, for the G.W.R. Company.

BEDWELLTY.—The U.D.C. has received sanction to borrow £3,500 for street improvements. A further erection of 24 houses at Argoed is being considered by the Council.

BLYTH.—The Central Hall Buildings, Market-place, are to be converted into a picture-hall to hold 1,100 persons for the Central Cinemas, Blyth, Ltd. A bank for the Bank of Liverpool & Martin's, Ltd., is to be erected at the corner of Waterloo-road. The contracts for both have been secured by Mr. S. F. Davidson, contractor, Newcastle, the architects being Messrs. White & Stephenson, 55, Pilgrim-street, Newcastle, and at Blyth.

BROMBOROUGH.—A bill to authorise Lever Brothers, Ltd., to construct a dock and other works at Bromborough has been deposited for introduction into Parliament next session.

BURNHAM-ON-CROUCH.—Plans passed by U.D.C.: Eight cottages in Western-road, by Messrs. G. Gould & Son; outbuildings at Rosemead, near Cobbins, for Mr. J. H. Rogers.

CARMARTHENSHIRE.—At a meeting of the Carmarthenshire C.C. it was resolved to adopt a comprehensive main roads' improvement scheme in the Eastern and Western divisions of the county. The divisional Surveyors were instructed to prepare plans and submit to Ministry of Transport for approval. The cost to the local authority is estimated at £20,000, and grants are to be received.

CIRENCESTER.—Plans have been approved by the U.D.C. for new buildings in Barton-lane to be erected by the Cirencester Electric Supply Co., Ltd., and 16 houses to be built in Somerford-road by the Cirencester and Cotswold Building Co.

CLEVEDON.—The U.D.C. has adopted a scheme of improvements to various roads estimated to cost £1,692 17s. 3d.

DARLINGTON.—The Corporation have applied for the loan of £65,000 for the water undertaking, principally in connection with the filter beds. It is proposed to substitute slow sand filters for mechanical ones and remove the peaty discoloration from the water.

ESHER.—Plans passed by U.D.C.: House, in Redlane, Claygate, for Mr. King; two houses, Esher, for Messrs. Coombes; house, New-road, Esher, for Messrs. Webb Bros.; house, Lime Tree-avenue, Thames Ditton, for Messrs. G. & W. Milham; house, Milbourne-lane, Esher, for Mr. W. D. Gravell; house, off Oaken-road, Claygate, for Mr. A. J. Hardwick.

GELLYGAER.—The U.D.C. has received intimation that the Ministry of Health will assist in the alleviation of housing shortage, and it was decided to apply for sanction to erect further houses in the district as soon as possible.

HATFIELD.—The R.D.C. proposes to erect 24 houses at Cecil-crescent.

HOWDEN.—The Howden Rural Council have been considering the question of providing a smallpox hospital instead of paying for additional beds at the County Smallpox Hospital.

HUDDERSFIELD.—The Corporation have decided to undertake extensive works at a cost of £120,000, in order to provide work for the unemployed. The work consists of doubling of tramway lines, sewage works extensions, widening and repaving of roads, construction and extension of water mains, and the demolition of old buildings.

KENDAL.—Plans passed by T.C.: Garage at Longpool, for Messrs. Jas. Parker & Son; conversion of High Park, Oxenholme, into two dwelling-houses, owner Mr. A. H. Wilson, architect Mr. E. A. Fulton.

LAMPETER.—Sanction has been received by the Council to borrow £1,100 and £2,400 for purposes of building new market premises. The work is to be put in hand almost immediately.

LEEDS.—The Improvement Committee recommends application to the Ministry of Health for approval of the erection of 200 houses on the Middleton Estate, to be offered for sale to persons of the working class.—The Education Committee has purchased about 17 acres of land off Harrogate-road as a site for a secondary school at Chapel Allerton, at a cost of £1,500.

LEITH.—It is expected that tenders will be called for early in the New Year for the Leith Hospital extension.

LIVERPOOL.—Messrs. Woolworths' plans for their proposed new building on St. Peter's site, in Church-street, have been passed by the Health Committee.

LLANDILO.—A scheme for the construction of a light railway between Llandilo and Lampeter has reached an advanced stage and application has been made to the Ministry of Transport for a grant conditional to unemployed being absorbed in the work. £7,000 has been subscribed locally, and there is a Government promise to contribute a sum equal to local contributions towards construction. In addition, £45,000 has been granted by the Carmarthenshire County Council. It is hoped to deliver iron wine, known as Ogofan wine, at Pumpsaint as soon as the railway has been assured.

LLANELLY.—The Llanelly Borough Health Committee has recommended approval of the plans submitted by the Surveyor for extension to the Infectious Diseases Hospital, at an estimated cost of £4,427. It was decided by the Committee to put in hand work for altering the Old Town Hall buildings so as to convert them to a school clinic, &c., at estimated cost of £1,175.

LONDON (BERMONDSEY).—Plans passed by B.C.: Drainage of yard, for Proprietors of Hay's Wharf, Tooley-street; stores, 177, Abbey-street, J. Carmichael, Ltd., for Leiner & Son.

LONDON (STOKE NEWINGTON).—It has been decided to install electric light at the parish church of St. Mary.

LUDDENDEN FOOT.—The U.D.C. has instructed Messrs. Sutcliffe & Sutcliffe, architects, to prepare plans for four houses at Warley Wood.

MALTON.—Earl Fitzwilliam, the Lord of the Manor of Malton, has offered to the town a building site for a new hospital, the site to be selected on the Middlecave-road.

MERTHYR TYDFIL.—The Town Council has approved the Surveyor's recommendation that eight parlour type houses, at an estimated cost of £450 each, and twenty non-parlour type houses, at an estimated cost of £400 each, be erected at Gellyfaelog; and four parlour type, estimated at £420 each, and ten non-parlour type, estimated at £385 each, be erected at Heolgewig. The plans have been forwarded to the Ministry of Health for approval.

MILFORD.—The U.D.C. has decided to assist as far as possible the scheme of Messrs. Ward & Co. and Milford Docks Co. in reconstructing certain roads so as to facilitate the reinstitution of a coastal trade supplemented by inland roadway delivery to Haverfordwest and Whitland. Plans have been approved by the Council as follows:—Six houses for Mr. Fred Miller, Shakespeare-avenue; alteration to house of Mr. H. Farrow, Charles-street; alteration to bungalow and premises of Mr. Whitlaw, Hakin.

MONMOUTHSHIRE.—The following is a fairly complete list of the works to be undertaken by the various local authorities in the county immediately: Pontypool Guardians—Sewage disposal works, at Llanfrecha (Lower), £1,600; Panteg Council—new road from Sebastopol to north end of Griffithstown, to cost £4,800; Rhymney—the Council to improve the park, at a cost of £1,000, provided from the Miners' Welfare Fund; Ebbw Vale—the Council has applied for sanction to road construction schemes, estimated to cost £50,000 to £60,000; Bedwellty—the Council early in the New Year will put in hand new road from Pengam to Blackwood scheme, estimated to cost £16,000. In addition, a number of schemes of road widening and construction remain to be finally approved or sanctioned.

MORECAMBE.—Plans passed by T.C.:—Mr. E. Greenwood, conversion of a house into café, 3, Highfield; Messrs. Fahys, Ltd., roof to garage in Westover-street; Mr. R. Whiteside, detached house in Sulby-grove; Messrs. F. Moore & Co., two semi-detached houses in Sulby-grove; Mr. G. F. Renwick, detached house in Bare-lane; Mr. H. Baxter, semi-detached house and garage in Cable-street; Messrs. Procter & Entwistle, two semi-detached houses in Victoria-parade; Mr. H. Parker, detached house in Buckingham-road.

NEATH.—A Ministry of Health inquiry has been held into the application of the Neath R.D.C. to borrow £4,593 for works and drainage at Jersey Marine. It was proposed to lay a 12-in. pipe for outfall to the sea. In evidence it was stated that extensive docks and shipping facilities were projected in the neighbourhood.

NELSON.—The proprietors of the Grand Theatre, Nelson, have decided on important alterations at the end of the present season.

NEW QUAY.—The U.D.C. has received, and will consider, plans for erection of a memorial hall.

NEWPORT (MON).—The B.C. has decided to acquire land in order to continue the road from St. Julian-avenue to Caerleon-road.

NORTH SHIELDS.—Messrs. Smith's Dock Company have decided to proceed with an important extension scheme at their Bull Ring repairing docks, which will involve a big expenditure. It is proposed to reconstruct two of the three graving docks and lengthen them to accommodate large oil tankers and build a concrete wall round the docks.

NORTHAMPTON.—Plans passed by T.C.: New stables, Birchfield-road, for Mr. W. C. Smith; shop front, 29, St. Leonard's-road, for Messrs. Adams Bros.; extensions to offices, Roe-road, for Mr. W. W. King; two new cottages, Rothersthorpe-road, for Mr. H. Holton; new w.c.'s, 16 & 18, Stenson-street, for Messrs. A. H. Stevens & Co.; new dwelling house, Woodland-avenue, for Mr. A. J. Cockerill; new w.c., Albion-place, for Dr. Barnardo's Home; alterations to premises, Regent-square, for Mr. W. Ainge; four new dwelling houses, New-road, Far Cotton, for Mr. E. H. Tibbs; new boiler house, Primrose-hill, for the Trustees of Primrose-hill Congregational Church; new garages, Spring-gardens, for Mr. G. Frickman; alterations to premises, 44, Barrack-road, for Messrs. Pearks Dairies, Ltd.; new dwelling house, Abington Park-crescent, for Mr. T. Arnold; new dwelling house, Lime-avenue, for Mr. H. F. Baker; additions to premises, Abington-square, for Mr. E. Poole; additions to premises, 87, Abington-avenue, for Mr. Harris; motor garage, Kingsthorpe-grove, for Messrs. Allchin & Son; new lavatory and cloak room, 413, Abington Park-parade, for Mr. H. J. L. Matson; motor garage, Church-lane, for Mr. A. Hibbitt; furniture store, Sheep-street, for Messrs. Hamp & Sons; motor garage, Abington Park-parade, for Mr. A. Adnitt; new house and shop, Birchfield-road, for Mr. F. Andrew; new motor garage, Christchurch-road, for Mr. R. Seaton; new garage and workshop, Shakespeare Inn, Marefair, for Mr. C. E. Billington; new dwelling house, Weston-road, for Mr. W. E. Arnold; new lodge room, 6, Newland, for the Manchester Unity of Oddfellows; new shed, Green-street, for Messrs. Uandi, Ltd.; new workshop, Semilong-road, for Mr. B. Hasker; addition to premises, 130, Abington-avenue, for Mrs. Mary Green; new pavilion and sports ground, Kettering-road, for Messrs. J. Sears & Co.; new house, Woodland-avenue, for Mr. R. H. Brooks.——A contract, amounting to £10,360, has been signed between the vicar and churchwardens of Christ Church, and Messrs. H. Martin, Ltd., Northampton, for further work on the uncompleted portion of Christ Church. The work to be executed is as follows: Chancel, £6,506; lady chapel, £1,840; vestries and organ chamber, £1,614; incidentals, £400. Mr. C. H. Dorman, A.R.I.B.A., has been appointed architect to supervise the work. Plans passed by T.C.: House and shop, Birchfield-rd., Wantage Estate No. 3, for F. Andrew; motor garage, "Welford," Christchurch-road, for R. Seaton; garage and workshop, Shakespeare Inn, Marefair, for C. E. Billington; house, Weston-road, for W. E. Arnold; completion of erection of Christ Church, Wellingborough-road, for Vicar and Churchwardens, Christ Church; additions to premises, 139, Abington-avenue, for Mrs. Mary Green; pavilion and sports ground, Kettering-road, for J. Sears & Co.; house, Woodland-avenue, for R. H. Brooks.

NOTTINGHAM.—The erection of a new hospital for women, the site for which has been obtained in Peel-street, is to be proceeded with as soon as possible.

PEMBROKE.—The T.C. has decided to request the Charity Commissioners to allow the sale of land to the St. Patrick's Church, Pennar, who wish to build a new Sunday school.

PEMBROKESHIRE.—The C.C. Main Works Committee has considered the question of a new light railway from Letterston to St. Davids, a distance of thirteen miles, at an estimated cost of £9,000 per mile, and the addition of the cost of erection of one bridge. The scheme is to be undertaken by the G.W.R. and a subsidiary company, a deputation from whom waited on the Committee asking for support in the application for sanction to the Ministry of Transport, and a grant of from £10,000 to £20,000 toward cost, on the ground that unemployed can be absorbed in carrying out the work. The Committee decided to recommend the C.C. to make the suggested grant.——The G.W.R. company has decided to build a station at Heathfield, Pemb.——Lord Merthyr has informed the local council that he intends to carry out road works at St. Issell's.

PENARTH.—The U.D.C. has decided to construct additional houses as the Ministry of Health offer to assist in erection of ten to fifteen houses if the Council erects thirty houses in addition at its own cost and on own site. Application has been made by the Council

* See also our List of Contracts, Competitions, etc.

to borrow £5,000 to put in hand Beach-hill improvement scheme.

PENYDONT (GLAM.).—The R.D.C. is applying for an electricity supply order and projects plant installations and power house building.

PONTYPRIDD.—The U.D.C. has decided to apply for sanction for permission to put in hand the construction of certain main subsidiary roads at Graig-yr-Lesc, Cilfynydd, Dynea, and Pantygraigwen.

PORT TALBOT.—The B.C. has decided definitely to carry out the drainage of Aberavon Moors, the cost to be borne, two-thirds by the Ministry of Agriculture and one-third by owners of the land.

PORTHCAWL.—The U.D.C. is to consider plans for sectional dam to entrance to dock to prevent mud drift.

POULTON.—Plans passed by U.D.C.: Mr. John Thomas Roskell, two wash-houses in Tithebarn-street; Mr. W. E. Potts, garage at Little Poulton; Mr. G. Ellison, four houses in Lower Green; Mr. John Hayes, bungalow in Occupation-road; Mrs. S. A. Talbot, bungalow in Occupation-road.

RHYMNEY VALLEY.—At a meeting of the Rhymney Valley Joint Water Board attention was called to the serious water shortage in Gellygaer and Senghenydd. It was decided to ask the Taf Fechan Water Board to lay an auxiliary main as soon as possible. The auxiliary main will be threequarters-of-a-mile in length.

ROCHDALE.—Plans passed by T.C.: Rev. Canon Chipp, church, Maclure-road; Geo. Baker & Bros., additions to Victoria Foundry, Princess-street; J. W. Lees & Co., alterations and additions at Crawford Arms public house, Crawford-street; Lewis Fletcher, five dwelling-houses, Churchill-street; Rochdale & District Co-operative Laundries Association, Ltd., carpet-beating premises, Norman-road.

RUGBY.—Plans passed by U.D.C.:—Mr. S. Bartlett, stabling, &c., 134, Claremont-road; trustees of Hospital of St. Cross, alterations and additions to Hospital, Barby-road; Mr. William Brooke, motor garage, 7, Whitehall-road.——Plans passed by R.D.C.: Smithy, The Vineries, Sutton, for Messrs. W. & J. R. Thompson; additions, Elm Farm, Steeton, for Steeton Co-operative Society's garage, Banks-lane, Riddlesden, for Mr. A. Howgate, and twelve dwelling-houses, adjoining Hospital-road, for Mr. E. Procter.

SCARBOROUGH.—A scheme of flats in the East Ward is incorporated in a draft housing scheme approved by the T.C. in Committee. The scheme refers to certain sites in Longwestgate, between Church Stairs-street and Castlegate, and the houses are planned in the form of blocks of flats. Each block has a balcony at the rear, approached by the main staircase. There are nine flats in each block.

SHILDON.—The U.D.C. has passed plans for four houses to be erected by the North Eastern Railway Co.

SKIPTON.—The Skipton and District Smallpox Hospital Committee have entered into a provisional agreement with Mr. Edward Taylor, of Airton, near Skipton, for the purchase of six acres of land on his farm for a smallpox hospital for the north-west portion of the West Riding.

STAINFORTH (DONCASTER).—Plans have been approved for the erection of 250 to 500 houses, for the Hatfield Main Colliery Company. The architect is Mr. Harold Plewes, surveyor, Thorne, near Doncaster.

STANFORD-LE-HOPE.—The Essex C.C. has decided to rebuild bridge No. 194.

STRANRAER.—The Scottish Board of Health has allocated ten additional houses to the T.C.

SUNDERLAND.—The Building Committee have passed plans for the erection, by private builders, of a villa in Abbot's-grove, Thornhill; two houses in Mount-road East; and for a number of motor garages.

SWANSEA.—Plans passed by T.C.:—Additions to workshop, Whyndham-street, for Mr. C. Hodge; alterations, Gospel Hall, George-street, for the Trustees; house, Gower-road, for Mrs. E. S. Davies; two bungalows, Penlan, Brynhyfryd, for Messrs. Palmer Bros.; additions to bakery, Danygraig-terrace, for Mr. T. R. Cranfield; two houses, Carmarthen-road, for Mr. A. Payne; garage, 103, St. Helen's-avenue, for Mr. N. Mainwaring; house, Pentregethin-road, for Mr. D. Bevan; house, Queen's-road, Coedsaeson, for Mr. D. A. Williams; bungalow, Hendrefoilan-road, for Mr. D. A. Williams; bungalow, Bayswater-road, Sketty, for Mr. A. D. King; two houses, Middle-road, for Mr. J. L. Davies; two houses, Hillside-crescent, for Mr. T. G. Griffiths; two houses, Long Oaks-avenue, for Mr. William Moffat; six houses, Carmarthen-road, for Messrs. J. & F. Weaver; alterations and new garages, Belgrave-lane, for Mr. J. H. Roberts; eight houses, New-road off Glanmore-road, for Messrs. J. Pye & Co.; bungalow, Boarspit-lane, Norton, for Mr. J. Hooper; house, Hendrefoilan-road, for Mr. A. Simpson; house and stable, Manor-road, for Mr. H. Hawkins; offices, &c., Strand, for Messrs. Dann & Co.; four houses, Sketty-road, for Messrs. Thomas & Lewis; four houses, Llythryd-avenue, for Mr. Wm. Morgan; garage, Brooklands-terrace, for Mr. Wm. Morgan; dairy, 32, Glanbrydan-avenue, for Messrs. J. James & Sons; store, Swansea-road, Dunvant, for Mr. M. E. Davies; bungalow, Oystermouth-road, Blackpill, for Mr. G. Jones; house, Oystermouth-road, Blackpill, for Mr. G. Jones; house, off Queens-road, Mumbles, for Messrs. Davies & Beynon; house, Park Wern-road, for Mr. B. J. Sims; additions, Strand, for the Cold Storage and Ice, Ltd.; house, West Cross-lane, for Mr. A. J. Millard; house, Sketty-road, for Mr. Owen Harris; five shops and offices, Gower-street, for Messrs. Pascoe, Price, Rees & Co.

TAMWORTH.—The T.C. has decided to ask the Tamworth Building Society to confer with the Housing Committee as to the possibility of developing the Wigginton-road site.

TENBY.—The U.D.C. has called for plans in connection with the Ritec River Improvement Scheme. The Council is considering Serpentine-road improvement and Belvedere-Maudlin[illegible] **m adows new** roads' schemes, estimated respectively at £2,300 and £4,000.

THORNTON.—Plans passed by U.D.C.: Bungalow, Queen's-road, for Mrs. Harris; flats and shops, Victoria-road, for Messrs. R. Leach & Sons; bungalow, West-drive, for Miss Armstrong; bungalow, West-drive, for Mr. H. Holt; dwelling-house, School-road, for Messrs. F. W. Lee & Co.; house and shop, Victoria-road, Cleveleys, for Mr. Eastwood; pair of semi-detached houses, Clevcleys-avenue, for Mr. Smith; pair of semi-detached houses, Rossall-road, Cleveleys, for Holt & Dawson; semi-detached bungalow, Woodland-avenue, for Rev. A. J. King; bungalow, Way Gate, for Miss Vickers; two pairs of bungalows, Lawson's-road, for Mr. Lancaster; house, St. David's-avenue, for Mr. G. Lancaster; house, Marsh-road, for Mr. A. G. Holt; alterations to house, Alexandra-avenue, for Mr. Newman; estate plan, Blackpool-road, for trustees of late B. C. Sykes; alterations to house, Lime-grove, for Mrs. Shaw; development of Victoria-road, for Mr. Threlfall.

TILBURY.—It is proposed by the Essex C.C. to erect a Council school for the accommodation of 300 infants, at an estimated cost of £7,000.

WALLASEY.—Plans passed by B.C.: Four houses, Seaview-road, for Dr. E. Molyneux; two houses, St. George's-park, for Messrs. Tate, Pumford & Doughty; addition to garage, Leasowe-road, for Messrs. F. & E. Ward; extension of classrooms at St. Mary's Parish Hall, for the Vicar and Wardens of St. Mary's Church; house, Melling-road, for Messrs. R. Costain & Son; new street, off Hamilton-road, for Messrs. Harrocks Brothers; workshop, 8, Church-road, for Mr. J. N. Dickie; garage, 2, Groveland-road, for Mr. W. K. Gatley; house, Wallasey-road and Loretto-road, for Messrs. Williams & Williams; house and shop, Mill-lane and Leominster-road, for Mr. J. W. Bradshaw; three houses, Claremount-road, for Mr. G. A. Lindley; house, Hamilton-road, for Messrs. Harrocks Brothers; pavilion, Rake-lane, for the New Brighton Bowling Club; two houses, St. George's-park, for Messrs. Tate, Pumford & Doughty; house, Lymington-road, for Messrs. Evans & Williams.

WEST BROMWICH.—The Town Council is undertaking the construction of a new sewer in the Hill Top area, at an estimated cost of £26,000.

WHITBY.—The Trustees of the Whitby Cottage Hospital have acquired a large piece of land in Spring Hill as the site for the War Memorial Hospital. A considerable sum of money has been subscribed towards this object.

YORKSHIRE.—It is proposed to reclaim about 800 acres of land situated in the vicinity of Spurn and Kilnsea in the east of Yorkshire. During the last thirty years, gravel and soil washed from the Yorkshire cliffs have extended Spurn Head by about half a mile.

FIRES.

ELPHINSTONE.—A fire which occurred on Christmas evening completely destroyed Elphinstone Public School, East Lothian.

GLASGOW.—Damage, estimated at £20,000, has been caused by a fire in the Cyro ink works, Holland-street, occupied by Farquharson Bros., Ltd., typewriter ribbon and stencil paper manufacturers.

MIDDLEPORT.—The bakery of the Burslem and District Co-operative Society, in Newport-lane, has been destroyed by fire.

RAMSBOTTOM.—Extensive damage has been caused by a fire at Messrs. Woods' garden engineering works.

SOUTHAMPTON.—Damage to the extent of several thousand pounds has been done by fire at the store of Messrs. Pickford, Ltd., carriers.

YORK.—About £1,000 damage has been done by a fire which broke out in Messrs. Mennell Brothers' timber yard at New Earswick.

YSTRADGYNLAIS.—Damage to the extent of £300 was done by fire at the premises of Mr. Joseph Ridy, confectioner, Dumfries-place, on December 29.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach him *not later than Tuesday evening.*

* Denotes *accepted.* † Denotes *provisionally accepted.*

‡ Denotes *recommended for acceptance.*

§ Denotes *accepted subject to modifications.*

ABERDEEN.—For (*a*) supply of steel pipes, (*b*) supply of special castings, and (*c*) laying of aqueduct, from West Cults to Pitfodels, for the T.C.:—

*(*a*) T. Piggott & Co., Birmingham	£22,113 11 8
*(*b*) Stanton Iron Co., Nottingham	2,109 16 6
*(*c*) Unit Construction Co., London	23,730 9 10

ABERGAVENNY.—For the erection of 10 houses, for the T.C.:—

†S. D. Bevan, Beaufort	£3,970

ABERTILLERY.—For widening the main road a the Royal Oak, Llanhilleth, for the U.D.C.:—

*Messrs. Blackburn & Co., Treharris	£4,754

BEDWELLTY.—For erection of 12 houses on the Pengam and Blackwood site, for the U.D.C.:—

R. P. Evans, Fleur-de-lis	£6,968 9 0
Thomas Green, Blackwood	5,742 17 0
Messrs. F. & R. Lewis, Bargoed	5,117 17 0
Thornton Hall, Cardiff	4,994 0 0
J. Broadmead, London	4,980 0 0
Evan James, Ystrad Mynach	4,963 16 0
Building Guild, Blackwood	4,896 7 0
*Messrs. Meeker Bros., Abertillery	4,126 17 4

BLACK NOTLEY.—For painting shelters at Sanatorium, for the Essex C.C.:—

*Letch & Bowtell	£105

BRENTFORD.—For additions and alterations at public baths, Clifton-road, for the U.D.C. Mr. W. J. Westlake, Surveyor, Brentford:—

Jennings & Co., London	£2,135 15 0
Dilliway & Elvy, West Kensington	1,866 7 0
Ferris Bros., Acton	1,864 6 7
Lorell & Son, Gerrards Cross	1,776 0 0
Slade & Co., Barnsbury Park	1,740 0 0
D. Halse & Co., Woolwich	1,710 0 0
Arding & Hobbs, Clapham	1,700 0 0
Hunt & Son, High Wycombe	1,700 0 0
Willesden Building Co., Acton	1,688 0 0
Frost & Carter, Luton	1,669 0 0
J. Dovey & Co., Brentford	1,600 0 0
Hidden & Co., Brentford	1,599 0 0
*G. Challis, Brentford	1,598 0 0
Heath, Ltd., Chelsea	1,572 0 0

CHESTERFIELD.—For completion of (*a*) St. Augustine's-crescent, and (*b*) St. Augustine's-avenue, for the T.C.:—

*W. W. Bateman, Chesterfield	(*a*)	£323 14 10
	(*b*)	319 10 0

COGGESHALL.—Reconstruction of culvert on main road, for the Essex C.C.:—

*J. S. Norton, Halstead	£311 17 6

COLWYN BAY.—Reconstruction of Victoria Pier pavilion, for the U.D.C.:—

*Braithwaite & Co., West Bromwich	£16,300

ATHLONE.—For erection of 11 houses at Woollen Mills Field, for the U.D.C. Mr. T. J. McNamara, architect, 192, Great Brunswick-street, Dublin, and Mr. P. J. O'Loughlin, Borough Engineer, The Courthouse, Athlone:—

	Tender for Houses. In hollow concrete walls.	Tender for Houses. In brickwork.	Tender for Road, Sewers and Watermains.
J. Concannon, Athlone	£7,760 7 10	——	£690 6 3
P. Nolan, Athlone	6,782 1 11	£6,864 11 11	645 10 0
J. O'Connell, Dublin	6,654 5 10	——	605 10 0
Murphy Bros., Dublin	7,347 0 0	8,117 0 0	——
McCabe & Co., Cavan	5,621 0 0	5,621 0 0	160 0 0
C. Doyle, Mullingar	6,997 18 6	7,397 18 6	663 1 0
Beckett, Ltd., Dublin	7,796 0 0	7,996 0 0	756 0 0

Referred to Local Government Department.

BRIGHTON.—For erection of school of five departments in Loder-road, for the E.C. Messrs. T. Simpson & Son, surveyors, 16, Ship-street, Brighton:—

	Main estimate.	Extra cost for tiled roof instead of slate.	Main estimate plus cost for tiled roof.	Extra cost for glazed tiled dados to classrooms, Hall and cloakrooms.
Saunders, Brighton	£17,928 0 0	£365 0 0	£16,293 0 0	£612 0 0
A. & S. Wheater, Brighton	15,831 15 9	282 11 1	16,064 6 10	563 9 4
Sidney A. Roper, Ipswich	15,875 0 0	175 0 0	16,050 0 0	495 0 0
Lehane & Co., Ltd., Derby	15,481 4 0	226 1 1	15,707 5 1	584 11 9
T. D. L. Piper & Sons, Brighton	15,400 0 0	145 0 0	15,545 0 0	332 0 0
H. J. Penfold, Brighton	13,927 0 0	187 0 0	14,114 0 0	457 0 0
Rowland Bros., Horsham	13,963 0 0	129 0 0	14,092 0 0	399 0 0
Coles Bros., Ltd., Bath	13,750 0 0	223 0 0	13,973 0 0	498 0 0
T. W. Heath, Ltd., Chelsea	13,650 0 0	76 18 0	13,726 18 0	405 0 0
I. W. Woolnough, Eastbourne	13,488 0 0	184 0 0	13,672 0 0	536 10 0
F. R. Hipperson, London	13,487 0 0	118 10 0	13,605 10 0	334 5 0
Bainbridge & Son, Eastbourne	13,169 0 0	202 19 0	13,371 19 0	770 16 0
Allen Fairhead & Sons, Enfield	13,192 0 0	126 0 0	13,318 0 0	429 0 0
W. A. Field & Cox, Brighton	13,098 0 0	208 0 0	13,306 0 0	367 0 0
James Bodle, Ltd., Eastbourne	12,998 0 0	230 0 0	13,228 0 0	480 0 0
Bunning & Fitton Adams, Ltd., Godalming	12,987 0 0	179 0 0	13,166 0 0	377 0 0
James Barnes & Sons, Brighton	12,987 0 0	167 0 0	13,154 0 0	461 0 0
R. Cook & Sons, Crawley	12,945 0 0	175 0 0	13,120 0 0	485 0 0
Battley, Sons, & Holness, London	12,886 0 0	165 0 0	13,051 0 0	467 0 0
William Saint, Ltd., Cambridge	12,812 0 0	190 0 0	13,002 0 0	450 0 0
Geo. Slade & Co., Ltd., London	12,800 0 0	79 0 0	12,879 0 0	414 0 0
Gibson, Ltd., Croydon	12,554 0 0	106 0 0	12,660 0 0	443 0 0
Pattinson & Sons, Ltd., London	12,443 0 0	93 0 0	12,536 0 0	491 0 0
Hoad & Taylor, Horsham	11,952 0 0	269 14 4	12,221 14 4	398 0 0

CHAPEL-EN-LE-FRITH.—For construction of concrete service reservoir and providing and laying about 5,200 lineal yards of 5 in. cast-iron spigot and socket pipes, &c., for the R.D.C. Messrs. Brady & Partington, Engineers, Town Hall, Chapel-en-le-Frith :—

North of Scotland Transport Co., Montrose	£10,530	17	3
M. Simpson & Son, Sheffield	9,363	3	6
J. Pennington & Co. and Inchley & Co., Bowden	8,915	19	3
Thomas Coates, Bury	8,852	9	6
W. H. Rogers, Wolverhampton	8,548	2	1
John Hudson & Sons, New Mills	8,250	0	0
George Riley, Luddenden Foot	8,076	4	6
Wm. Muirhead Macdonald Wilson & Co., Birmingham	7,929	0	6
Alex. Hyslop, Manchester	7,732	0	6
John Taylor & Son, Basford	7,259	12	8
Fram Reinforced Concrete Co., Ltd., Manchester	7,250	0	0
Unit Construction Co., Ltd., Liverpool	6,806	0	0
Abraham Graham, Huddersfield	6,691	18	0
H. Butterworth, Whaley Bridge	6,580	0	2
C. S. Tomlinson, Normanton	6,488	19	9
James Byron, Ltd., Bury	6,356	0	0
J. E. Nadin & Son., Ltd., Sheffield	6,309	18	2
T. Patrick, Bradford	6,261	3	6
Herbert Ashley, Mansfield	6,174	16	4
J. J. Blackburn, Manchester	6,126	0	0
C. Collins & Co., Radcliffe	5,850	0	0
W. Lane, Ltd., Cambridge	5,437	8	6
H. C. Pullar & Co., Manchester	5,369	3	3
*Chas. Wade, Luddenden Foot, York	5,354	2	8

COWDENBEATH.—For erection of 16 houses, for the T.C. Mr. C. A. Alexander, Burgh Surveyor, Town House, Cowdenbeath :—

Brickwork—			
Dunlop & Co., Lanark	£4,752	3	7
B. Reynolds & Son, Stirling	4,446	0	0
North of Scotland Transport Co., Ltd., Montrose	3,679	0	7
The Fife Building Co., Cowdenbeath	3,609	6	1
D. Cowan, Lochgelly	3,493	11	6
J. Baxter & Sons, Dunfermline	3,408	7	8
J. & J. B. McLauchan, Larbert	3,328	13	6
John Summerville, Dunfermline	3,194	9	0
Durie & Son, Inverkeithing	3,115	13	11
Robert Coll, Dunfermline	3,072	11	10
Malcolm & Co., Kirkcaldy	3,053	1	10
Arnott McLeod & Co., Edinburgh	2,998	0	0
Andrew Wilson, Senr., Cowdenbeath	2,959	18	9
*Street & Co., Dunfermline	2,957	0	0
Slater and Roughcast Work—			
Hope & Stewart, Cardenden	£1,098	1	9
A. Dobson & Son, Edinburgh	1,158	7	6
North of Scotland Transport Co., Ltd., Montrose	1,050	11	6
F. White & Co., Glasgow	958	15	0
Wm. Anderson & Son, Edinburgh	938	16	6
John Walker, Alva	887	7	2
Wm. Stewart & Son, Crossgates	848	12	3
Lind Bros., Lochgelly	845	11	9
John Paul & Sons, Cowdenbeath	845	7	2
P. Kelly & Son, Dunfermline	788	17	3
John Robertson & Sons, Dunfermline	745	1	2
*Jas. Lowe, Crossgates	676	11	
Cement and Plaster Work—			
Wm. Hunter, Montrose	£897	1	1
North of Scotland Transport Co., Montrose	825	15	9
Wm. Stewart & Son, Edinburgh	795	10	8
Street & Co., Dunfermline	779	0	0
Peter Harle, Sunderland	746	3	6
John Walker, Alva	708	18	7
Lind Bros. Lochgelly	665	0	5
Alex. Gorrie, Cowdenbeath	657	6	10
John Paul & Sons, Cowdenbeath	656	13	6
*Anderson & Kennedy, Cowdenbeath	639	6	7½
Joiner Work—			
W. & J. R. Watson, Ltd., Edinburgh	£2,504	13	8
J. & R. W. Slevwright, Arbroath	2,459	0	0
David Arnott, Cardenden	2,415	12	11
Feguson Bros., Cowdenbeath	2,349	19	8
L. Swinton & Son, Leven	2,340	14	6
Anderson & Walker, Dunfermline	2,260	19	0
Street & Co., Dunfermline	2,239	0	0
John Reid, Crossgates	2,201	19	6
John King & Co., Lochgelly	2,190	5	1
J. & J. Milne, Cowdenbeath	2,185	1	6
E. Finlayson, Cowdenbeath	2,131	6	6
C. Bryson & Son, Dunfermline	2,069	11	6
Andrew Adamson, Cowdenbeath	2,061	18	4
*Robt. Brough & Sons, Dunfermline	1,979	5	8
Plumber Work—			
North of Scotland Transport Co., Montrose	£1,286	4	0
McCulloch & Giffen, Glasgow	1,246	0	10
D. Thomson, Cowdenbeath	1,047	1	6
H. Twaddle & Son, Glasgow	1,046	1	11
Sydney Binning, Cowdenbeath	1,035	14	10
Wm. Nicol, Buckhaven	965	5	3
*A. Thomson & Co., Dunfermline	921	9	6
Glazier Work—			
*J. Haxton & Co., Kirkcaldy	£62	8	2

GOSFORTH.—For erection of 20 houses, Coxlodge housing scheme, Farndon-road, for the U.D.C. Mr. Geo. Nelson, Engineer and Surveyor, Gosforth :—

H. W. Hornby, Gosforth	£12,700 0
Geo. Tiffin, Spital Tongues	10,550 0
G. Robertson & Co., Gosforth	9,500 0
W. C. Fleck, Gosforth	9,348 0
H. McEwan, Newcastle	9,338 10
T. Lumsden, Jarrow	9,206 0
J. Bruce & Sons, Newcastle	£9,000 0
J. W. White, Sunderland	9,000 0
T. E. Ridley, Gosforth	8,970 0
J. W. Braithwaite, Newcastle	8,866 5
W. G. Armstrong, Blaydon-on-Tyne	8,698 5
W W Franklin, Newcastle	8,696 4
W. Spetch, Gosforth	8,500 0
Durham & Veevers, Gateshead	8,290 0
Co-operative Wholesale Society, Newcastle	8,207 0
Bolam, Simpson & Bolam, Birtley	8,175 0
Stanley Millar, Newcastle-on-Tyne	8,050 0
A. Anderson, Newcastle	8,000 0
J. T. Bell, Newbiggin-by-the-Sea	7,910 10
E. S. Lathaen, Newcastle	7,648 5
J. S. Teanby, Sheffield	7,637 0
J. S. Hetherington, Newcastle	7,600 0
*J. T. Lunn & Co., Gateshead	7,351 0

GOSFORTH.—For construction of roads and sewers, Coxlodge Housing Site, for the U.D.C. Mr. Geo. Nelson, engineer and surveyor, Gosforth :—

General Contractors, Middlesbrough	£6,281	18	1
C. T. Borrill & Co., Great Grimsby	6,246	9	0
H. Coxhead & Co., Middlesbrough	5,347	19	2
Edgar & Mole, Newbiggin-by-the-Sea	4,737	19	0
P. R. Hayes & Sons, Jesmond, Newcastle	4,466	0	8
F. M. Willers & Co., Bishop Auckland	4,333	6	9
J. McLaren, junr., Newcastle-on-Tyne	4,225	16	1
Campbell, Kenyon & Co., Acton, W.3	4,129	18	8
John Lant, Newcastle-on-Tyne	4,096	12	9
W. C. Fleck, Gosforth	4,059	9	9
G. E. Simpson & Co., Newcastle-on-Tyne	4,055	13	6
G. Percy Trentham, Edinburgh	4,008	8	0
C. S. Bunch, Newcastle-on-Tyne	3,873	10	7
Border Engineering Contractors Ltd., Whitehaven	3,830	4	2
Dyson, Lindsley & Co., Chesterle-street	3,625	3	4
*J. W. Robson, Gosforth	3,467	8	9
G. Mackay & Son, Edinburgh	3,308	7	0
D. G. Somerville & Co., Newcastle-on-Tyne	3,095	0	6

HAROLD WOOD.—For construction of about 880 yards of 9 in. stoneware pipe sewer, &c., at Harold Wood, for the Romford U.D.C. Mr. W. J. Grant, Surveyor, South-street, Romford :—

*B. H. Hale, Romford.

HENDON.—For erection of 20 further artisans' dwellings, for the U.D.C., on the Brent Hill Farm Estate. Mr. George Hornblower, architect, 2, Devonshire-terrace, Portland-place, W.1 :—

Frank Parvin, Ltd., Mill Hill	£13,270	0	
G. E. Everitt & Sons, Ltd., Croydon	10,904	0	
T. J. Lovell & Son, Paddington	10,204	0	
J. E. Billings & Co., Oxford	9,457	0	
J. Guttridge & Sons, Peterborough	9,254	0	
William F. Blay, Ltd., Dartford	9,080	0	
Geo. Slade & Co., Ltd., Islington	9,022	0	
Arthur Cole, Ltd., Luton	7,340	0	
Chas. Groom, Sons & Co., Ltd., West Ealing	6,952	0	
*Perry Bros., Ealing	6,156	10	

HOVE.—For laying new sewer, new footway, and other works in Westbourne-place, for the T.C. Mr. H. H. Scott, Borough Surveyor, Town Hall, Hove :—

C. V. Buchan & Co., Ltd., Southwick .. £1,174

HULL.—For the erection of houses on the Hessle-road and Cottingham-road sites, for the T.C. :—

	Per house.
*T. H. Wilburn, Scunthorpe—	
Eleven blocks of six non-parlour houses	£302 6 8
Two blocks of two parlour houses	321 0 0
Two blocks of two non-parlour houses	271 0 0
*Stubbley & Fell, Sutton-in-Ashfield—	Per house.
Eight blocks of six non-parlour houses	£340
One block of two non-parlour houses	315

LATCHINGTON.—For widening bridge No. 220, for the Essex C.C. :—

*W. & C. French, Buckhurst Hill £533 18

LAURIESTON.—For construction of sewers, &c., for the Stirling C.C. Messrs. Wilson & Tait, C.E., Grangemouth :—

*F. Flaherty, Falkirk £1,250

LIVERPOOL.—Painting, &c., parts of Green-lane Public Office, for the T.C. :—

*Crowther & Bailey, Liverpool £119

LIVERPOOL.—For valves required in connection with trunk main from Prescott to Liverpool, for the T.C. :—

*Olley & McLellan, Worcester £1,380 10

LONDON.—For renovating office at Osborn-street sub-station, for the Stepney B.C. :—

Jarvis, J., & Sons, Ltd., 8, Wormwood-street, E.C.	£425	0	0
Jennings, J., & Son, Ltd., 42–44, Leman-street, E.	359	0	0
Johnson Bros., 168, Whitechapel-road, E.	335	0	0
*Weston, G. E., & Sons, 42, Wellclose-square, E.	318	15	0

LONDON.—For two steel bridges in connection with the extension of the line from Golders Green to Hendon, for the Underground Railway Co. :—

*Charles Brand & Son £8,155

LONDON.—For repairs at Library, &c., for the Paddington B.C. :—

*H. J. Edgar £104

LONDON.—For supplying and laying terrazzo floor at Osborn-street sub-station, for the Stepney B.C. :—

Art Pavements and Decorations, Ltd., St. Paul's-crescent, Camden Town	£254	8	0
Fenning & Co., Ltd., Palace Wharf Rainville-road, Hammersmith	234	0	0
Simpson, W. B., & Sons, 100, St. Martin's-lane, W.C.	155	15	6
The Silcon Co., 17, Warwick-square, S.W.	123	2	3
*McIver, R., & Sons, Ltd., 11, Queen Victoria-street, E.C.	120	12	0

LONDON.—Supply of ½-mile three-way 4-in. earthenware conduits to the Stepney B.C. :—

Doulton & Co., Ltd., Lambeth, S.E.	£97	12	6 (unsuitable)
Albion Clay Co., Ltd., 133, High Holborn, W.C.	117	6	8
*Sutton & Co. (Overseal), Ltd., Ashby-de-la-Zouch	117	6	8

LONDON.—Supply of 1 ton plumbers', ½ ton tinmens,' and ¼ ton blow-pipe solder to the Stepney B.C. :—

Farmiloe, T. & W., Ltd., Rochester-row, S.W.	£171	0	0
Neale, G.W., Ltd., 83, Upper Thames-street, E.C.	144	12	6
*Pizey, G., & Sons, 39, Forest-road, Dalston	142	0	0

LONDON.—Provision of fire-proof staircase at Duke Shore Wharf, for the Stepney B.C. :—

Dorman, Long & Co., Ltd.	£180	0	0
General Iron Foundry Co., Ltd.	172	0	0
Whitford Armstrong Co.	159	0	0
M. T. Shaw & Co., Ltd.	158	0	0
Safety Tread Syndicate	142	0	0
Drew, Bear, Perks & Co., Ltd.	139	10	0
J. & W. Shale, Ltd.	135	0	0
*Carron Company	120	8	6

LONDON.—Supply of 2,000 tons of cement to the Bermondsey B.C. :—

*Public Authorities Mutual Supplies, Ltd. : £2 12s. 8½d. per ton alongside wharves.

MULLINGAR.—For erection of 12 workmen's houses, for the Town Commissioners. Mr. P. J. O'Loughlin, Borough Surveyor, The Courthouse, Athlone :—

Philip O'Reilly, Killucan	£8,800	0	
Jas. Beckett, Ltd., Dublin	8,324	0	
J. R. Thompson, Dublin	8,300	0	
John Murphy, Dublin	7,589	14	
Ed. Walsh, Mullingar	7,060	0	
*Doyle & Sexton, Mullingar	£585 per house		

*For 10 houses only instead of 12, subject to the approval of the Local Government Department.

NORTHAMPTON.—For erection of four "B 3" houses with shop-fronts, and four "B 3" at Allington, for the T.C. :—

*H. Holton £3,382

NORTHAMPTON.—For erection of two "B 3" houses with shop-fronts, Harleston-road, for the T.C. :—

*S. F. Gibson £786

NORTHAMPTON.—For erection of 60 houses at Far Cotton, for the T.C. :—

*H. Martin, Ltd. £22,308

NORTHAMPTON.—For erection of 20 non-subsidy houses at Far Cotton, for the T.C. :—

*H. Martin, Ltd. £6,195

PRESTON.—For erection of retaining walls, abutments, &c., at Oxheys Bridge, over the L. & N.W. Railway, for the T.C. The Borough Surveyor, Town Hall, Preston :—

*T. Croft & Sons, Ltd., Preston £15,368

REDDING.—For construction of sewers, sewage tanks, filters, &c., for the Stirling C.C. Mr. Gilbert Thomson, engineer, 164, Bath-street, Glasgow :—

*Symington & Arthur, Ltd., Airdrie.

REIGATE.—For asphalte resurfacing roads within the borough, for the T.C. Mr. A. Smith, Town Clerk, Municipal Buildings, Reigate :—

	One Coat Wk.	Two Coat Wk.
Associated Asphalte Co., Ltd., Westminster	£8,167 5 11	£8,739 16 11
Limmer and Trinidad Lake Asphalte Co., Westminster	7,824 12 7	8,301 15 1
Highways Construction Ltd., Westminster	7,792 1 1	8,086 5 7
Whitehall Asphalte and Engineering Co., Ltd., London	7,659 10 3	8,088 18 6
Chittenden & Simmons, Ltd., Maidstone	7,650 4 0	8,079 12 3
*Constable Hart & Co., London	£7,353 13 9	£7,830 1

ROMFORD.—For construction of about 1,980 yds. of 12 in. diameter stoneware pipe sewer, &c., in South Hornchurch, for the R.D.C. Mr. W. J. Grant, Surveyor, South-street, Romford :—

*Campbell, Kenyon & Co., Acton.

TIPTON.—For construction of (1) new road, 650 yards long by 14 yards wide, &c.; (2) stoneware pipe sewers in the Gospel Oak and Ocker Hill districts; (3) stoneware and cast-iron pipe sewers in the Summer Hill and Princes End districts, for the Unemployment Relief Works, for the U.D.C. Mr. W. H. Jukes, Surveyor, Public Offices, Tipton :—

	Contract No. 1: New road.	Contract No. 2: Gospel Oak and Ocker Hill sewerage.	Contract No. 3: Summer Hill and Princes End sewerage.
Muirhead, Macdonald, Wilson & Co., Ltd., Birmingham	£8,875 12 3	£3,084 15 2	£8,204 2 0
Radford, Tebbs & Co., Ltd., Derby	9,565 1 9	3,718 13 8	10,293 10 10
*Chas. Jackson, Tipton	*5,565 0 9	3,260 14 6	8,255 10 4
E. Clarke, Stratford-on-Avon	6,734 11 10	2,998 7 7	8,219 13 9
Martin & Element, Ltd., Smethwick	6,338 10 0	....	....
E. E. Jeavons & Co., Tipton	6,247 17 1	2,992 0 3	9,005 5 5
J. Hunt & Co., Smethwick	5,739 12 0	3,145 4 6	11,680 5 6
Henry Boot & Sons, Westminster	7,345 15 0	3,364 2 6	9,462 17 6
W. H. Rogers, Wolverhampton	5,743 19 0	3,016 8 1	8,837 10 0
Andrew Blair, Lyell & Co., Birmingham	7,609 6 3	....	....
*W. Element & Sons, Tipton	5,714 7 3	*2,180 19 8	*7,059 16 3
Surveyor's estimate	5,905 3 9	2,867 5 6	8,555 18 11

SEVERALLS.—Erection of cow house, sheds, &c., at Mental Hospital, for the Essex C.C. :—

*Myall Bros., Leigh-on-Sea £1,728

THAXTED.—Rebuilding of bridge, No. 16, for the Essex C.C. :—

*A. J. Arnold, Chelmsford..... £949 12

WALLASEY.—For painting at police headquarters, for the T.C. :—

*T. Baker £156 7

WALTHAM ABBEY.—For strengthening of Dobbs Weir Bridge, for the Essex C.C. :—

*F. W. Paul & Son, Waltham Abbey.... £267

WESTBURY.—For construction of about 8,700 yards of stoneware pipe sewer, varying in size from 7 in. to 9 in., with manholes and all appurtenant works, and the erection of a 73 ft. diameter filter bed, for the U.D.C. Messrs. W. H. Radford & Son, engineers, Albion Chambers, King-street, Nottingham :—

Coles Bros., Ltd.	£18,000 0 0
Abraham Graham & Sons	17,300 0 0
Hodsons, Ltd.	15,907 0 0
G. Percy Trentham	14,452 6 0
Hussey & Egan	14,306 8 4
Timothy Patrick	14,000 0 0
Holloway & Sons	13,850 0 0
Crawford Bros.	12,836 6 11
W. Lane, Ltd.	12,452 8 0
T. Flower & Co., Ltd.	12,404 14 0

Manufacture of Portland Cement.

The British Portland Cement Research Association (6, Lloyd's-avenue, E.C.3) has issued a pamphlet compiled by Messrs. J. W. Christelow and E. Bowes, entitled "The Viscosity of Raw Material Slurry Used in the Manufacture of Portland Cement." The pamphlet gives detailed accounts of tests carried out to ascertain the extent of the economy to be effected by the addition of sodium carbonate in the mix.

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